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NOT TO BE TAKEN AWAY. CEYLON



PART IV.—EDUCATION, SCIENCE, AND ART (C)

Administration Report of the Director of Medical and Sanitary Services for 1947

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ADMINISTRATION REPORT OF THE DIRECTOR OF MEDICAL AND SANITARY SERVICES FOR THE YEAR 1947.

Section 1—VITAL STATISTICS.

| | 1946. | 1947. |
|---|--------------|-----------|
| 1. Estimated population of the Island on July 1 .. | 6,695,000 .. | 6,879,000 |
| 2. No. of births registered during the year .. | 256,886 .. | 271,177 |
| 3. Birth rate for 1,000 of the population .. | 38.4 .. | 39.4 |
| 4. No. of deaths registered during the year .. | 135,937 .. | 98,544 |
| 5. Death rate per 1,000 of the population .. | 20.3 .. | 14.3 |
| 6. No. of infant deaths registered during the year .. | 36,096 .. | 27,387 |
| 7. Infant death rate per 1,000 live births .. | 141 .. | 101 |
| 8. No. of maternal deaths registered during the year .. | 3,987 .. | 2,863 |
| 9. Maternal death rate per 1,000 live births .. | 15.5 .. | 10.6 |

Table of the Main Causes of Deaths Registered in Ceylon.

| | 1946. | 1947. |
|--|------------|--------|
| All causes :— | 135,937 .. | 98,544 |
| 1. Infectious and parasitic diseases .. | 28,673 .. | 17,192 |
| Typhoid fever and paratyphoid fever .. | 1,296 .. | 1,078 |
| Diphtheria .. | 147 .. | 114 |
| Influenza .. | 1,564 .. | 1,306 |
| Dysentery .. | 1,824 .. | 931 |
| Tuberculosis of the Respiratory System .. | 3,627 .. | 3,510 |
| Tuberculosis of other organs .. | 372 .. | 322 |
| Disseminated Tuberculosis { Acute .. | 10 .. | 10 |
| { Chronic .. | 3 .. | — |
| Malaria fever and malarial cachexia .. | 12,578 .. | 4,557 |
| Black water fever .. | 9 .. | 5 |
| Ankylostomiasis .. | 1,337 .. | 1,065 |
| 2. Cancer and other tumours .. | 829 .. | 881 |
| 3. Rheumatic Diseases, Nutritional Diseases, Diseases of the Endocrine Glands and other general diseases .. | 9,041 .. | 7,457 |
| Acute Rheumatic Fever .. | 2,267 .. | 1,900 |
| Rickets .. | 423 .. | 422 |
| Mandama .. | 5,666 .. | 4,513 |
| 4. Diseases of the Blood and Blood making organ .. | 2,833 .. | 2,100 |
| 5. Chronic Poisonings and intoxicants .. | 4 .. | 7 |
| 6. Diseases of the nervous system and of the organs of special sense .. | 16,422 .. | 11,172 |
| Infantile convulsions (age under 5 years) .. | 12,896 .. | 8,170 |
| 7. Diseases of the Circulatory System .. | 3,380 .. | 3,152 |
| 8. Diseases of the Respiratory System .. | 14,494 .. | 11,584 |
| Bronchitis .. | 1,512 .. | 1,040 |
| Broncho-pneumonia including Capillary Bronchitis .. | 2,453 .. | 2,488 |
| Lobar Pneumonia .. | 2,272 .. | 1,547 |
| Pneumonia, unspecified .. | 5,716 .. | 4,445 |
| 9. Diseases of the Digestive System .. | 8,759 .. | 6,407 |
| Diarrhoea and enteritis (Under 2 years of age) .. | 1,503 .. | 1,560 |
| Diarrhoea and enteritis (2 years and over) .. | 5,479 .. | 3,243 |
| 10. Non-venereal diseases of the Genito-urinary System and Annexa .. | 1,769 .. | 1,579 |
| 11. Diseases of pregnancy, Child-birth and the Puerperal state .. | 3,987 .. | 2,863 |
| Puerperal Haemorrhage .. | 342 .. | 373 |
| Puerperal sepsis not returned as post-abortive .. | 908 .. | 660 |
| Puerperal albuminuria and convulsions .. | 1,847 .. | 1,132 |
| 12. Diseases of the skin and cellular tissue (Exclude Rata of Infants) .. | 1,088 .. | 915 |
| 13. Diseases of the Bones and organs of locomotion .. | 31 .. | 24 |
| 14. Congenital Malformations .. | 122 .. | 80 |
| 15. Diseases of early infancy (includes Rata) .. | 18,948 .. | 14,894 |
| Congenital debility .. | 6,488 .. | 6,026 |
| Premature Birth .. | 5,090 .. | 4,687 |
| Rata .. | 7,089 .. | 3,908 |
| 16. Old age .. | 8,386 .. | 7,010 |
| 17. Violent and accidental deaths .. | 3,392 .. | 3,488 |
| 18. Ill-defined causes of death .. | 13,759 .. | 7,739 |
| Causes of death unstated or undefined { (a) Dropsy .. | 1,921 .. | 1,044 |
| { (b) Pyrexia .. | 10,456 .. | 5,311 |

The general death rate, maternal mortality and infant mortality rates for 1947 are the lowest ever recorded in Ceylon.

A comparative study of Vital Statistics for 1946 and 1947 reveals the following facts:—

The death rate has been reduced from 20.3 per 1,000 in 1946 to 14.3 per 1,000 in 1947. This reduction meant a saving of 41,000 lives.

The Maternal Mortality rate has been reduced from 15.5 to 10.6 in 1947 which meant a saving of 1,328 mothers in child birth.

The Infant Mortality rate, which is the most sensitive index we possess of physical welfare and effect of good Government, has been reduced from 141 per 1,000 in 1946 to 101, which meant a saving of 11,000 babies.

This big reduction in the different mortality rates is without any parallel in Ceylon or in any other country in the world, and should be attributed primarily to the efforts of the Medical Department, particularly in relation to the Maternity and Child Welfare services, and the Control of Malaria.

The attack on Malaria which was till 1946 the chief cause of mortality and morbidity in Ceylon has been achieved by the residual spraying with D.D.T. Ceylon can perhaps take the pride of place of having the finest Anti-Malarial Organization in the world. The application of the latest methods of Malaria Control on an extensive basis throughout the whole Island, wherever Malaria is endemic, is an unique experiment which has more than justified our fondest hope.

The other factors which have contributed to the fall in the various death rates are the improvement in the standard of living of the masses, the development of public health conscience, the provision of free midday meals in schools, the supply of milk for infants and pre-school children by the milk feeding centres, and the absence of any serious epidemic.

There appears to be some other factors still at work, of which we have no definite knowledge. It has been observed that the mortality has been decreasing practically in every country in spite of the Great War, for which no scientific explanation has yet been offered.

Section 2—GENERAL DISEASES.

As in previous years malaria continued to be the most prevalent disease. 48,232 cases were treated in Hospitals and 1,211,648 at out-door Dispensaries. A summary of the most prevalent diseases is shown in the following table:—

Table of Morbidity in respect of In-Patients and of Out-Patients.

Table of Morbidity in respect of In-Patients.

| Diseases. | 1946. | | 1947. | |
|---|---------------|--------|---------------|--------|
| | No. of Cases. | | No. of Cases. | |
| Enteric | .. | 5,213 | .. | 5,213 |
| Malaria | .. | 96,667 | .. | 48,232 |
| Malarial Cachexia | .. | 4,614 | .. | 3,008 |
| Influenza | .. | 13,913 | .. | 17,972 |
| Dysentery | .. | 9,258 | .. | 7,758 |
| Tuberculosis | .. | 7,775 | .. | 8,682 |
| Syphilis | .. | 2,263 | .. | 2,578 |
| Gonorrhoea | .. | 1,921 | .. | 2,961 |
| Cancer | .. | 2,913 | .. | 2,960 |
| Chronic Rheumatism | .. | 6,133 | .. | 7,848 |
| Affections of the Eye | .. | 10,525 | .. | 10,401 |
| Bronchitis | .. | 11,389 | .. | 18,945 |
| Broncho-Pneumonia and Pneumonia | .. | 23,224 | .. | 22,918 |
| Asthma | .. | 4,558 | .. | 6,436 |
| Diarrhoea | .. | 13,718 | .. | 14,984 |
| Ankylostomiasis | .. | 9,807 | .. | 11,527 |
| Ascariasis | .. | 4,345 | .. | 5,769 |
| Abscess | .. | 9,339 | .. | 9,561 |
| Diseases of Joints | .. | 1,973 | .. | 2,222 |

Table of Morbidity in respect of Out-Patients.

| Diseases. | | 1946. | 1947. |
|----------------------------------|----|---------------|---------------|
| | | No. of Cases. | No. of Cases. |
| Malaria | .. | .. 2,546,610 | .. 1,211,648 |
| Malarial Cachexia | .. | .. 120,494 | .. 87,633 |
| Influenza | .. | .. 610,747 | .. 769,173 |
| Dysentery | .. | .. 39,564 | .. 40,272 |
| Syphilis | .. | .. 1,700 | .. 2,170 |
| Gonorrhoea | .. | .. 7,053 | .. 6,768 |
| Chronic Rheumatism | .. | .. 421,373 | .. 499,367 |
| Ear Diseases | .. | .. 62,040 | .. 91,774 |
| Diseases of the Lungs and Pleura | .. | .. 511,571 | .. 613,444 |
| Gastric Diseases | .. | .. 804,220 | .. 862,680 |
| Skin Diseases | .. | .. 352,638 | .. 428,953 |
| Ulcers | .. | .. 514,331 | .. 559,953 |
| Eye Diseases | .. | .. 159,735 | .. 130,613 |
| Ankylostomiasis | .. | .. 251,483 | .. 316,310 |
| Intestinal Troubles | .. | .. 464,945 | .. 620,246 |

Section 3—COMMUNICABLE DISEASES.

The following table gives the number of cases and deaths from communicable diseases notified for the whole Island inclusive of the three Municipalities:—

| | | 1946. | | 1947. | |
|-------------------|----|----------|---------|----------|---------|
| | | Cases. | Deaths. | Cases. | Deaths. |
| Chicken-pox | .. | .. 4,778 | .. 4 | .. 4,533 | .. 1 |
| Cholera | .. | .. 74 | .. 37 | .. — | .. — |
| Diphtheria | .. | .. 201 | .. 27 | .. 140 | .. 31 |
| Dysentery | .. | .. 2,145 | .. 222 | .. 1,246 | .. 124 |
| Enteric (Typhoid) | .. | .. 2,308 | .. 321 | .. 2,096 | .. 273 |
| Measles | .. | .. 934 | .. 1 | .. 3,896 | .. 4 |
| Mumps | .. | .. 1,229 | .. 1 | .. 1,315 | .. — |
| Phthisis | .. | .. 1,932 | .. 639 | .. 2,106 | .. 508 |
| Plague | .. | .. — | .. — | .. — | .. — |
| Small-pox | .. | .. 409 | .. 67 | .. 1 | .. — |
| Whooping Cough | .. | .. 406 | .. 14 | .. 348 | .. 9 |

Plague.

There were no cases of plague during the year. The last case of rat plague in the Island occurred on August 23, 1938, and the last case of human plague on May 29, 1938.

Cholera.

There were no cases of cholera in the Island during the year. The last case of cholera occurred in December, 1946.

Small-pox.

Only 1 non-fatal case of small-pox occurred in the Island during the year. 191,704 primary vaccinations and 65,388 secondary vaccinations were performed during the year. The number of primary vaccinations represent 75 per cent. of the previous year's births. 21 Sanitary Inspectors obtained their certificates of competence in vaccinations against small-pox, making a total of 518 Sanitary Inspectors who have qualified themselves to carry out vaccinations.

Anti-Typhoid Inoculation.

The following table shows the number of inoculations given:—

| | | 1946. | 1947. |
|----------|----|-----------|-----------|
| 1st dose | .. | .. 54,760 | .. 86,521 |
| 2nd dose | .. | .. 40,638 | .. 59,287 |

Ankylostomiasis Campaign.

The year under review commenced with 21 dispensers distributed as follows:—

4 in area of Divisional Medical Superintendent (Health), Colombo;
 4 in area of Divisional Medical Superintendent (Health), Kandy;
 4 in area of Divisional Medical Superintendent (Health), Anuradhapura;
 4 in area of Divisional Medical Superintendent (Health), Kurunegala;
 3 in area of Divisional Medical Superintendent (Health), Ratnapura;
 and 2 in Head Office.

Campaign Procedure.

The procedure of placing Ankylostomiasis Campaign dispensers under the administrative control of the Divisional Medical Superintendents (Health) was continued during the year. The Medical Officers of Health carry out the treatments in all parts of their districts, but the services of District Medical Officers and Apothecaries in charge of Dispensaries in their areas are utilised for treatment when it is found that excessive travelling will have to be done if they were to supervise the work.

The Medical Officers of Health prepare advance programmes of treatment for the whole of their areas in consultation with the District Medical Officers and Apothecaries in charge of dispensaries in their districts when their services are required for supervision of treatment.

Certificates of Competency.

During the year 37 Sanitary Inspectors and 2 Estate Dispensers were granted certificates of competency to administer treatment for hook-worm infestation under supervision.

Comments on the Statistics for 1947. (*Vide* tables given below).

TABLE I.—Treatments by all Agencies.

Ankylostomiasis Treatment by all Agencies in 1947 and 1946.

| Agencies. | Treatments 1947. | | | 1946. |
|---------------------------------|------------------|-------------|-----------|-----------|
| | First. | Subsequent. | Total. | Total. |
| <i>Government Institutions.</i> | | | | |
| (1) At Institutions .. | 874,585 | 51,021 | 925,606 | 807,963 |
| (2) Outside Institutions .. | 56,323 | 2,136 | 58,459 | 61,680 |
| <i>Campaign Dispensers.</i> | | | | |
| (1) School children .. | 251,502 | — | 251,502 | 133,506 |
| (2) Estate labourers .. | 333,796 | — | 333,796 | 180,672 |
| (3) Villagers .. | 94,263 | — | 94,263 | 47,341 |
| Mandapam Camp .. | 49,632 | — | 49,632 | 70,969 |
| Estate Medical staff .. | 92,385 | — | 92,385 | 74,008 |
| Total .. | 1,752,486 | 53,157 | 1,805,643 | 1,376,139 |

There is an increase of 429,501 treatments as compared with last year's report.

TABLE II.—Treatments at Government Institutions.

Ankylostomiasis Treatments at Government Hospitals and Dispensaries in 1947.

| Province. | Attendance. (First Visits). | Treatments. | | |
|-------------------|--------------------------------|-------------|-------------|---------|
| | | First. | Subsequent. | Total. |
| Western .. | 1,508,647 | 208,965 | 12,445 | 221,410 |
| Northern .. | 455,755 | 59,534 | 2,082 | 61,616 |
| Eastern .. | 388,302 | 33,096 | 2,441 | 35,537 |
| Southern .. | 927,012 | 147,316 | 8,718 | 156,034 |
| North-Central .. | 430,106 | 50,383 | 3,675 | 54,058 |
| North-Western .. | 1,036,365 | 135,406 | 7,584 | 142,990 |
| Central .. | 932,580 | 113,499 | 7,409 | 120,908 |
| Uva .. | 351,384 | 37,289 | 1,746 | 39,035 |
| Sabaragamuwa .. | 642,185 | 89,097 | 4,921 | 94,018 |
| Total for 1947 .. | 6,642,336 | 874,585 | 51,021 | 925,606 |

There is an increase of 117,643 treatments as against 1946.

TABLE III.—Treatments outside Institutions without Campaign Dispensers.

Ankylostomiasis Treatment given by the Medical Officers of the Department outside their institutions without the aid of the Campaign Dispensaries during 1947.

| Month. | Schools. Number Treated. | Estates. Number Treated. | Villages. Number Treated. | Total. Number Treated. |
|-------------------|--------------------------------|--------------------------------|---------------------------------|------------------------------|
| January | 1,784 | 1,486 | 1,273 | 4,543 |
| February | 1,647 | 1,920 | 2,107 | 5,674 |
| March | 1,489 | 3,333 | 744 | 5,566 |
| April | 2,196 | 1,774 | 389 | 4,359 |
| May | 1,978 | 873 | 1,432 | 4,283 |
| June | — | 2,148 | 391 | 2,539 |
| July | 2,336 | 964 | 1,062 | 4,362 |
| August | 756 | 1,287 | 2,888 | 4,831 |
| September | 2,948 | 2,965 | 3,711 | 9,624 |
| October | 1,214 | 1,320 | 2,196 | 4,730 |
| November | 2,163 | 1,481 | 383 | 4,027 |
| December | — | 2,455 | 1,466 | 3,921 |
| Total for 1947 .. | 18,511 | 21,906 | 18,042 | 58,459 |

The Medical Officers of the Department have administered 58,459 treatments outside their Institutions without the aid of the Campaign Dispensers in schools, estates, and villages as against 61,660 treatments in schools, estates, and villages during 1946.

TABLE IV.—Treatments at Mandapam Camp.

Ankylostomiasis Treatment at Mandapam Camp during 1947.

| Month. | Number Arrived. | Number Treated. | Percentage Treated. |
|-------------------|-----------------|-----------------|------------------------|
| January | 2,166 | 1,965 | 90·7 |
| February | 3,251 | 2,967 | 91·3 |
| March | 5,185 | 4,740 | 91·4 |
| April | 5,840 | 5,299 | 90·7 |
| May | 6,731 | 6,133 | 91·1 |
| June | 7,637 | 6,944 | 90·9 |
| July | 7,003 | 6,311 | 90·1 |
| August | 3,257 | 2,967 | 91·1 |
| September | 1,917 | 1,738 | 90·7 |
| October | 5,068 | 4,639 | 91·5 |
| November | 3,266 | 2,976 | 91·1 |
| December | 3,258 | 2,952 | 90·6 |
| Total for 1947 .. | 54,579 | 49,631 | 90·9 |
| Total for 1946 .. | 78,475 | 70,969 | 90·4 |

The drop of 21,338 treatments when compared with the figures of last year was due to the fact that only 54,579 immigrant labourers came to Ceylon for work in estates during the year, of which 49,631 were given treatment.

TABLE V.—Treatments by Campaign Dispensers.

Ankylostomiasis Treatments given by Campaign Dispensers in Schools, Estates and Villages during 1947.

| Month. | Treatments. | | | Total. |
|-------------------|--------------------|----------------------|------------|---------|
| | School children | Estate Labourers. | Villagers. | |
| January | 13,075 | 8,480 | 7,165 | 28,720 |
| February | 17,182 | 17,859 | 8,301 | 43,342 |
| March | 29,512 | 25,920 | 12,516 | 67,946 |
| April | 5,090 | 10,156 | 4,167 | 19,413 |
| May | 14,885 | 13,155 | 6,774 | 34,995 |
| June | 25,726 | 26,777 | 9,642 | 55,431 |
| July | 20,679 | 31,476 | 4,139 | 54,420 |
| August | 14,780 | 32,411 | 7,814 | 49,005 |
| September | 20,254 | 45,264 | 11,660 | 81,592 |
| October | 23,448 | 29,322 | 5,473 | 58,208 |
| November | 32,966 | 38,857 | 6,901 | 81,734 |
| December | 33,905 | 54,119 | 9,711 | 97,735 |
| Total for 1947 .. | 251,502 | 333,796 | 94,263 | 679,561 |

In all 679,561 treatments were administered by the Campaign Dispensers in schools, estates and villages as against 361,519 treatments in schools, estates and villages during 1946.

TABLE VI.—Statement of Work.

Number of Days spent by Anky, Dispensers on Treatment and Educational Work and the Number of Talks given by them during 1947.

| | | | |
|--|----|----|--------|
| Number of Dispensers (19 in the field and 2 at the Head Office) | .. | .. | 21 |
| Number of days spent on treatment | .. | .. | 734 |
| Number of days spent on Anky Education | .. | .. | 1,091 |
| Number of villages visited | .. | .. | 960 |
| Number of homes visited | .. | .. | 26,818 |
| Number of individual talks given in homes | .. | .. | 24,462 |
| Number of village group talks given | .. | .. | 1,692 |
| Number of school talks given with charts | .. | .. | 480 |
| Number of lantern talks given | .. | .. | 74 |

This shows the number of days spent by the dispensers on treatment and educational work and the number of talks given by them during the year.

TABLE VII.—Treatments by Estate Staff.

Ankylostomiasis Treatments reported as given by Estate Medical Staff during 1947.

| Province. | Census of Estates treated. | Treatments. | | | Percentage of Total Treatments to Census. |
|----------------|----------------------------------|-------------|-------------|-----------|--|
| | | First. | Subsequent. | Total. | |
| Southern | .. 10,104 | .. 2,272 | .. 1,240 | .. 3,512 | .. |
| North-Western | .. 1,468 | .. 648 | .. 64 | .. 712 | .. |
| Western | .. 22,269 | .. 3,476 | .. 2,341 | .. 5,817 | .. |
| Central | .. 260,124 | .. 48,662 | .. 8,741 | .. 57,403 | .. |
| Sabaragamuwa | .. 84,770 | .. 13,128 | .. 2,486 | .. 15,614 | .. |
| Uva | .. 68,446 | .. 7,598 | .. 1,729 | .. 9,327 | .. |
| Total for 1947 | .. 447,181 | .. 75,784 | .. 16,601 | .. 92,385 | .. |

The number of treatments reported by the Superintendents of estates who maintain hospitals and dispensaries on their estates is more by 18,377 treatments when compared with last year. This is due to the fact that there is an increase in the number of scheduled estates than last year.

Yaws.

There were 989 known infectious and 2,063 non-infectious cases of Parangi during the year.

Filariasis.

Filariasis survey work suspended since 1939 was restarted as from November 1, 1947, and for this purpose a special officer, Dr. W. L. P. Dassanayake, who has had previous experience in the work, was appointed.

The areas investigated during the short period of 2 months in the year were the suburbs of Colombo and the work consisted mainly of detection of clinical cases, location of infective foci of the disease and determination of the insect vectors and their breeding places, with a view of adopting control measures as early as possible.

The importance of propaganda work to win the co-operation of the public, especially for the blood surveys in the night, was fully realised and for this purpose lantern lectures showing slides depicting all the factors associated with the disease were given in 16 localities in the areas.

During the short period 125 clinical cases with lymphangitis and elephantiasis of legs were detected in the surveyed areas.

Night blood surveys were carried out on the following localities and 813 films were taken, out of which 44, that is 5.3 per cent., were found positive for *microfilaria bancrofti*.

| Place. | Number of Blood films taken. | Number Positive for Micro- filaria. |
|--|------------------------------------|--|
| Kirillapone Tamil School | 58 | 3 |
| Anula Vidyalaya, Nugegoda | 43 | 2 |
| 47th Lane, Wellawatta | 43 | 5 |
| Kirillapone C. C. School | 35 | 5 |
| Vihare lane, Wellawatta | 51 | 5 |
| Kalubowila | 58 | 1 |
| Hampden lane, Wellawatta | 16 | 1 |
| Kirillapone B. T. School | 53 | 3 |
| Nawala C. C. School | 48 | 3 |
| Stafford avenue, Wellawatta | 48 | 3 |
| Mahawatta | 47 | 4 |
| Nawala Government School | 55 | 2 |
| Rajagiriya Government School | 48 | — |
| Spinning and Weaving Mills, Wellawatta | 48 | 4 |
| Kotte C. C. School | 128 | 2 |
| Nugegoda Market square | 34 | 4 |

From the mosquitoes caught from the areas and dissected the main insect vector was found to be culex fatigans.

The chief breeding places of culex fatigans were found to be the catch pits, behind bucket latrines and stagnant drains in the area. Control measures are being adopted and the work of investigation is being continued.

Tuberculosis.

2,145 patients were under care—661 in Hospitals and 1,484 in their homes. The isolation in homes was again not satisfactory in 964 of these cases.

The following Institutions have been chiefly responsible for the care of Tuberculosis :—

- (1) Chest Hospital, Ragama.
- (2) Chest Hospital, Kandana.
- (3) Sanatorium, Kankesanturai.
- (4) King George V Memorial Hospital, Welisara.
- (5) A. T. I., Colombo.
- (6) Chest Hospital, Talagolla.
- (7) Kotte T. B. Survey.
- (8) Galle T. B. Clinic.

The bed strength of the Ragama, Kandana, Kankesanturai, Welisara and Talagolla Chest Hospitals is approximately 800, but the bed strength at Welisara will soon be brought up to 600 when the necessary equipment is ready.

The following Laboratory Examinations were done :—

| Sputum. | Urine. | Blood. |
|-----------|----------|--------|
| 13,005 .. | 5,549 .. | 1,040 |

Diet.—The patients in the T. B. Hospitals are given a special diet termed “ T. B. Diet ”. This consists of rice and curry twice a day, 2 eggs, one orange, fresh butter and bread, two plantains, 1 pint of milk, tea or coffee.

Arrangements have been made with the Deputy Food Controller to supply these institutions with the best variety of rice available.

Staff.—The following table shows the present staff and the additional staff required for the efficient working of these Institutions :—

| | Present Staff. | Additional Staff required. |
|-----------------------|---|------------------------------|
| Ragama .. | 1 Medical Officer 2 Assistant Medical Officers | 2 Assistant Medical Officers |
| Kandana .. | 1 Medical Officer | 1 House Officer |
| Kankesanturai .. | 1 Medical Officer | 1 House Officer |
| Welisara .. | 1 Medical Officer 1 Assistant Medical Officer | 4 Assistant Medical Officers |
| Galle T. B. Clinic .. | 1 Medical Officer | 1 Assistant Medical Officer |

A team consisting of 1 Medical Officer, 1 Sanitary Inspector and 2 Public Health Nurses were sent to U. K. for training in T. B. work.

The dearth of trained Medical Officers in the treatment of T. B. is a handicap to the efficient working of these Institutions.

A certain amount of reluctance on the part of Medical Officers to come forward for training in T. B. work appears to be present, and it is felt that a special allowance, if offered to officers engaged in this work, may overcome this reluctance.

T. B. Survey, Kotte.

The following routine activities were carried out:—

- (1) Propaganda carried out by Medical Officer and Field Staff on all Field Visits and at clinics held at the A.T.I.
- (2) Home visiting was regularly done. Patients' houses visited at least once a month and contacts at least one in 3 months.
- (3) Tuberculin testing was done—
 - (a) On all home contacts of new cases.
 - (b) On all old contacts exposed to infection.
 - (c) In schools selected for the purpose.
- (4) X-Ray and Other Examinations at A.T.I. carried out of cases, contacts, persons under observation, and positive reactors to Tuberculin test.
- (5) Investigation done in the case of all examinees, into housing conditions, economic status, contact history, &c.

The following special activities were also carried out:—

- (i.) T. B. Survey in Government Offices—Surveyor General's and Deputy Food Controller's Office.
- (ii.) Participation in Health Work: Exhibits, demonstrations, &c.
- (iii.) Special T. B. Work commenced at H. U., Kalutara.
- (iv.) Consultation Clinics at A. T. I. held on first Thursday of each month.

Summary of Work Done.

| | | | |
|--|----|----|-----------------|
| 1. Mantoux Tests : Total tests | .. | .. | 2,396 |
| Percentage positive | .. | .. | 38.85 per cent. |
| 2. No. of persons X-Rayed | .. | .. | 1,221 |
| 3. Laboratory work—Sputum examinations | .. | .. | 494 |
| Blood counts | .. | .. | 291 |
| Urine examinations | .. | .. | 7 |
| Faeces examinations | .. | .. | 2 |
| Sedimentation rates | .. | .. | 14 |

The Superintendent, T. B. Campaign, has been away in U. K. on a Study Tour and on his return it is proposed to provide him with an office and staff in Colombo and to commence the work of re-organising T. B. work in the Island.

Leprosy.

Anti-Leprosy work was carried on during the year under review at:—

- (1) The two Leprosy Hospitals at Hendala and Mantivu.
- (2) The Out-door Clinic at Maradana and at Clinics attached to the Civil Hospitals.
- (3) The field organisation controlling and observing the Non-infectious cases and contacts.

The two Leprosy Hospitals are mainly for segregation, treatment and nursing of infective cases. The Leprosy Hospital at Hendala accommodates 608 patients while the Leprosy Hospital at Mantivu about 300.

| | | Leprosy Hospital Hendala. | Leprosy Hospital Mantivu | Total. |
|-------------------------------|----|---------------------------------|--------------------------------|--------|
| 1. Cases at end of 1946 | .. | 673 | 309 | 982 |
| 2. Cases at end of 1947 | .. | 674 | 329 | 1,003 |
| 3. Admissions 1947 | .. | 51 | 36 | 87 |
| 4. Deaths 1947 | .. | 40 | 11 | 51 |
| 5. Discharges 1947 | .. | 7 | 6 | 13 |
| 6. Repatriation to India 1947 | .. | 2 | — | 2 |
| 7. Re-admissions 1947 | .. | 18 | 10 | 28 |

Field Organisation of Leprosy Control.—Field work has been satisfactorily carried out. Almost all cases and contacts have been kept under observation and their records maintained up to date.

163 New Cases have been detected in 1947 as against 197 in 1946, 203 in 1945. A few cases reported themselves voluntarily at the central clinic—perhaps the result of propaganda and education. At the end of 1947 there were 1,003 cases scheduled to both hospitals, 1,723 on parole and 238 discharged on parole, making a total of 2,963 cases living in the Island as against 2,853 in 1946.

Analysis of the 2,963 living cases shows:—

| | | | |
|--------------------------------|----|----|-------|
| Typa :—Lepromatous | .. | .. | 740 |
| Neural | .. | .. | 2,223 |
| Stages :—L. Active Lepromatous | .. | .. | 740 |
| Neural Active | .. | .. | 912 |
| Quiescant | .. | .. | 699 |
| Arrested | .. | .. | 551 |
| Abortive | .. | .. | 61 |

Field Work is carried out by the 5 Apothecaries in the Campaign with the assistance of Sanitary Inspectors supervised by the Medical Officer, Leprosy Campaign.

Field Work consists of—

- (1) Observation of cases, contacts and Home visits.
- (2) Investigation into alleged cases of Leprosy.
- (3) Re-survey.
- (4) Propaganda.
- (5) Demonstrations and lectures to Medical and Apothecary Students, Sanitary Inspectors, &c.
- (6) Conferences.
- (7) Visiting schools and Examination of children.

Treatment.—A good deal of attention has been focussed on the question of treatment of leprosy by means of Sulpha drugs. It has however not been our privilege to use any of these drugs as yet, but it is hoped to give these drugs a trial immediately on receipt of them from Crown Agents.

Venereal Diseases.

Satisfactory progress was made during the year under review.

The following is a statement of visits of V. D. Clinics in the Island:—

| | 1945. | 1946. | 1947. |
|-------------------|--------|--------|--------|
| First visits | 13,620 | 12,143 | 9,725 |
| Subsequent visits | 72,095 | 77,679 | 88,364 |

The statistics available indicate that the Departmental Institutions treated:—

| | 1945. | 1946. | 1947. |
|---------------------|-------|-------|-------|
| Cases of Syphilis | 3,534 | 3,170 | 3,188 |
| Cases of Gonorrhoea | 2,474 | 2,051 | 1,948 |
| Cases of Soft Sore | 650 | 488 | 459 |

Follow up work has been satisfactory. The increase in attendance of subsequent visits is mainly due to the vigorous follow up work.

Drugs.—Supplies of Penicillin were regular during the year. The combination of Sulpha and Penicillin in the treatment of gonorrhœa has been proved extremely satisfactory. The treatment of acute syphilis at least can be greatly reduced if Penicillin is available for this condition too. Mapharside was not available during the year.

Training of Personnel.—No Laboratory Assistants, Sanitary Inspectors and Apothecaries were trained during the year, but four Medical Officers were trained in V. D. work.

Section 4—HYGIENE AND SANITATION.

Water Supply.

Three Municipal Council, 16 Urban Council, 4 Town Council and 43 Village Committee areas are having pipe-borne water supplies. In many instances augmentation schemes have been undertaken as the supplies are inadequate. Twenty-three other Village Committees have commenced work to construct pipe-borne water supplies to town areas. In rural areas action is also being taken to construct public wells out of loan funds. The number of wells newly constructed during the years 1946 and 1947 are as follows:—

| | | | 1946. | 1947. |
|--------------------------|----|----|-------|-------|
| Newly built public wells | .. | .. | 56 | 86 |
| private wells | .. | .. | 362 | 358 |

Most of the pipe-borne water supplies are bacteriologically examined periodically. 564 water samples were bacteriologically examined during the year 1947, and of these 198 showed evidence of recent pollution.

Disposal of Excreta.

During the year good progress was made in latrine construction. A total of 5,579 latrines were built as compared with 1,758 in 1946. The details of work done during the year are as follows:—

The total number of latrines newly constructed was 5,579. The latrines were made up of—Public latrines 135, private 5,265, schools 179. 2,114 old latrines were converted to sanitary type.

Free Squatting Plates for Latrines.

This scheme was inaugurated in 1940. Squatting Plates are supplied free of charge by this Department to villagers who are certified as poor by the Divisional Revenue Officer or the Medical Officer of Health. The Sanitary Inspectors supervise the construction of these latrines. The ordinary pit latrine and the bucket latrine are now superseded by the Departmental type Water Seal latrines in suitable areas.

Drainage.

2,381 feet of cement drains were newly constructed.

Licensed and Offensive Trades.

A comparative statement of the licensed and offensive trades in 1946 and 1947 and of the action taken to improve their sanitary condition is appended below:—

Licensed Trades:

| | | | 1946. | 1947. |
|--------------------------|----|----|---------|---------|
| No. existing | .. | .. | 20,777 | 23,456 |
| No. inspected | .. | .. | 20,439 | 23,287 |
| No. of inspections made | .. | .. | 218,592 | 264,643 |
| No. of defects found | .. | .. | 208,916 | 327,042 |
| No. of defects corrected | .. | .. | 138,214 | 198,977 |
| No. improved radically | .. | .. | 5,826 | 6,747 |

Offensive Trades:

| | | | | |
|--------------------------|----|----|-------|-------|
| No. existing | .. | .. | 2,759 | 2,557 |
| No. inspected | .. | .. | 2,663 | 1,359 |
| No. of inspections made | .. | .. | 9,589 | 7,243 |
| No. of nuisances created | .. | .. | 1,095 | 1,191 |
| No. of nuisances abated | .. | .. | 734 | 757 |

No specific reason can be attributed to the decrease in the number of offensive trades during the year.

Anti-fly Measures.

85,490 breeding places were found of which 75,098 were dealt with. Flies would appear to have become DDT resistant.

Food Sanitation.

Number of animals examined and reported on for slaughter during the years 1946 and 1947 is as follows:—

| | Cattle. | | 1946. | | 1947. |
|--------------------------|---------|----|--------|----|--------|
| No. inspected | .. | .. | 91,016 | .. | 68,263 |
| No. passed for slaughter | .. | .. | 88,534 | .. | 65,993 |
| | Goats. | | | | |
| No. inspected | .. | .. | 19,200 | .. | 34,179 |
| No. passed for slaughter | .. | .. | 18,775 | .. | 33,466 |

The large decrease in the number of cattle and the increase in the number of goats examined for slaughter is perhaps due to the anti-beef eating campaign which was in progress during the year.

Milk Supply.

| | | | 1946. | | 1947. |
|-------------------------|----|----|-------|----|-------|
| No. of samples analysed | .. | .. | 611 | .. | 407 |
| No. found adulterated | .. | .. | 412 | .. | 261 |

Sanitary Boards used to send milk samples regularly for analyses. They were converted to Town Councils and Village Committees at the commencement of the year. The decrease in the number of milk samples analysed during the year under review is due to these new Town Councils and Village Committees not making the necessary provision for this work.

Scheme of Rural Sanitation.

Out of the 21,414 villages, 6,720 were taken up and in them, 153,860 houses were worked, of which the number of new houses taken up during the year was 34,882, while the number of houses completed up to the end of 1947 was 19,892 of which 11,516 were during 1947. 32,861 houses were provided with compost pits. 54,677 houses were provided with vegetable gardens. 59,701 houses were provided with facilities for storing boiled and cooled water for drinking purposes. 44,901 houses were provided with windows and 5,681 latrines were constructed during 1947 of which 4,785 were under the Rural Sanitation Scheme.

Housing.

Of the 913,305 private premises, 647,427 were inspected, and of the 884,220 defects noticed, 674,005 were rectified. Out of the 9,239 public premises, 7,297 were inspected, and the number of inspections were 130,857 wherein 69,298 defects were noticed of which 40,029 were rectified.

5,082 building applications were received on which 5,070 reports were made. The number recommended was 3,733 and the number not recommended was 1,337.

Estate Health Work.

There were approximately 2,309 estates scheduled under the Medical Wants Ordinance (Cap. 176). The staff for health work consisted of the same officers as mentioned in last year's report.

There were 66 Hospitals and 116 Dispensaries maintained by the Government in Estate Medical Districts. In addition there were 93 Estate Hospitals and 723 Estate Dispensaries. All the Estate Hospitals were inspected during the year. The Estate Medical Attendants consisted of 3 qualified Medical Practitioners, 1 qualified Apothecary and 685 approved Estate Dispensers as against 4 qualified Medical Practitioners, 1 qualified Apothecary and 710 approved Estate Dispensers in 1946.

Sanitary conditions of the Estates.

| | | | 1945. | | 1946. | | 1947. |
|-----------|----|----|-------|----|-------|----|-------|
| Very good | .. | .. | 34 | .. | 20 | .. | 16 |
| Good | .. | .. | 228 | .. | 189 | .. | 181 |
| Fair | .. | .. | 148 | .. | 102 | .. | 112 |
| Poor | .. | .. | 24 | .. | 33 | .. | 25 |
| Bad | .. | .. | 12 | .. | 10 | .. | 5 |

Of the 339 Estates inspected during the year 42 Estates were fully provided with sanitary dust-bins and 106 partly as against 44 and 116 during the previous year.

Line Accommodation of those Inspected.

| | 1945. | 1946. | 1947. |
|--|-------|-------|-------|
| No. of estates having non-crowded lines .. | 363 | 278 | 272 |
| Slightly overcrowded .. | 37 | 52 | 46 |
| Overcrowded .. | 46 | 24 | 21 |

Of the 65,956 line rooms inspected, 58,057 were up to Government standard and the balance of 7,899 were not up to Government standard. In the estates inspected there were 10,978 pit, 8,356 bucket and 1,259 waterborne latrine compartments. 1,526 latrine compartments are further required.

| | 1945. | 1946. | 1947. |
|---|-------|-------|-------|
| Number of estates having sufficient number of latrines .. | 355 | 278 | 252 |
| Insufficient number of latrines .. | 77 | 62 | 79 |
| No latrines .. | 14 | 14 | 8 |

33 Estates had sanitary conveniences for children provided fully and 82 partially. 201 estates had entirely protected water supplies, 105 partly protected and 33 unprotected water supplies. 95,157 persons were treated for Ankylostomiasis on 248 estates.

On all estates there were 276 registered midwives serving 441 estates and 89 unregistered midwives serving 335 estates. In addition 197 estates were served by outside registered midwives, not employed on estates. 690 estates had creches and 357 estates were supplying cooked meals to the children. 230 estates had maternity wards and 35 estates had lying-in rooms attached to estate lines. 80 estates had clinics provided on the estates and 16 at the Government Hospitals and 105 other estates were served by outside clinics.

| | 1945. | 1946. | 1947. |
|--|--------|--------|--------|
| <i>Vaccination against small-pox.</i> | | | |
| No. of estates in which vaccination was carried out .. | 968 | 1,052 | 1,138 |
| No. of persons vaccinated .. | 26,737 | 28,572 | 24,851 |
| Vaccinations successful .. | 22,102 | 23,792 | 21,092 |
| Vaccinations unsuccessful .. | 1,373 | 774 | 1,063 |
| Vaccinations unknown .. | 5,262 | 4,006 | 2,696 |

Fourty-four estates were visited for anti-typhoid inoculations as against 45 estates in the preceding year. On these 44 estates, 5,998 first doses and 2,112 second doses were given. 116 visits by Inspecting Officers and 2,445 visits by Sanitary Inspectors were paid to estates in connection with communicable diseases.

Section 5—MATERNITY AND CHILD WELFARE WORK.

Maternity and Child Welfare work carried out at the various parts of the Island consisted of care at Institutions such as Hospitals and Maternity Homes, Health Centres and at homes of the individuals. The Institutions concerned in this work were the Maternity Hospital, Colombo; the District Hospitals, some of which are provided with special maternity wards; the Maternity Homes and other Maternity Homes provided by local authorities in their towns; and by philanthropic communities in the rural areas where Hospital facilities were not easily available.

There were 572 Health Centres in existence in 1947 and the main work was carried out at the Antenatal, Post-natal and Child Welfare Clinics. Care of mothers and children at home was given by Public Health Nurses and Midwives. Antenatal and post-natal care were given at the health centres where regular antenatal clinics were held every week. Obstetrical care to the mothers confined in rural areas and smaller towns was given by the Midwives under the personal supervision of Public Health Nurses.

Details of Work done—Maternity Homes.

The number of Maternity Homes run by Government for 1947 was 64 with 593 beds, the number of Maternity Homes run by Local Authorities was 12 with 64 beds and the number run by private bodies was 3 with 57 beds. The total number of admissions for 1947 was 14,803. 10,844 mothers delivered normally and the midwife, supervised by the Public Health Nurses whenever possible, conducted the deliveries. These Maternity Homes rendered very useful service to the community and were successful in preventing several maternal and infant deaths, particularly of premature babies which would have undoubtedly occurred were it not for the close and intensive care given to such mothers and babies by the Medical Officers of Health and the trained staff in these homes.

Health Centres and Clinics.

In the year under review, the number of health centres existing was 572, the number of clinics held was 16,591. Visits paid to these clinics during the year were as follows:—

| | | | | |
|---------------------|----|----|----|---------|
| Expectant mothers | .. | .. | .. | 324,256 |
| Infants | .. | .. | .. | 173,283 |
| Pre-School Children | .. | .. | .. | 66,648 |

Midwives and Their Work.

The number of midwives employed in Maternity and Child Welfare Work was 840 and they delivered 68,785 mothers in their homes. The number of homes visited by the midwives for the year under review was 991,057; the number of mothers sent to hospitals for deliveries by the midwives was 7,992. The number of *post-partum* visits made by the midwives was 553,836; and the number of maternal deaths among mothers looked after by them was 46.

Public Health Nurses.

There were 40 Public Health Nurses confined to Maternity and Child Welfare Work. They worked directly under the supervision of Medical Officers of Health and the number of home visits they have made for the year under review was 52,601. The Government Public Health Nurses paid 37,764 visits to expectant mothers, 29,784 visits to infants, and 20,932 visits to pre-school children.

Section 6—SCHOOL HEALTH WORK.

The following figures show the extent of the work done during the year under review:—

| | | | |
|--|-----|----|---------|
| Total number of schools | ... | .. | 5,689 |
| No. of schools taken up for medical inspection | .. | .. | 1,222 |
| No. of scholars medically examined | .. | .. | 89,910 |
| No. of scholars defective | .. | .. | 51,088 |
| No. of defects found | .. | .. | 110,560 |
| No. of defects treated | .. | .. | 56,561 |

1,222 schools were taken up for medical inspection as against 1,202 in the previous year. The number of scholars examined this year is 89,910 whereas 62,350 were examined last year. 51,088 scholars were found defective this year while there were 56,366 defective scholars last year. Number of defects found this year was 110,560 of which 56,561 were treated while 86,590 defects were found last year of which 37,211 were treated.

Section 7—HEALTH EDUCATION.

Health Education and propaganda were carried out on the same lines as in the previous year. This year too the special activity was campaign to educate the people with regard to the dangers of V.D., T.B., and the importance of the control of these diseases. The Press, the Radio and the publication of leaflets were all used in an intensive propaganda drive. The All-Ceylon Health Week was held in July. The celebrations were held for one week. The co-operation extended by other Departments made the Health Week a great success. A Health

Exhibition was held at the Central Y.M.C.A., Colombo, throughout the "Week" for the benefit of the school population and the general public. The programme of work was as follows:—

| | |
|--------------------------|---|
| Sunday, July 20, 1947 | ... General Propaganda; sermons in temples, Churches and mosques, distribution of leaflets and posters. |
| Monday, July 21, 1947 | ... Clean-up Campaign and Road Safety Drive. |
| Tuesday, July 22, 1947 | ... Anti-Malaria Demonstrations and Village Welfare. |
| Wednesday, July 23, 1947 | ... Food and Nutrition—Food Production and tree planting. |
| Thursday, July 24, 1947 | ... Maternity and Child Welfare. |
| Friday, July 25, 1947 | ... School Health Demonstrations and National Savings Movement Propaganda. |
| Saturday, July 26, 1947 | ... General Celebrations, processions and parades. |

Health Education was carried out by the various Medical Officers of Health, Sanitary Inspectors, Public Health Nurses and Public Health Midwives both at the clinics and during house to house visits. In this connection 130 lectures illustrated with lantern slides, 2,520 lectures without lantern slides, and 40 cinema shows were held during this year.

Health Education work was also done by the Health Demonstration Van in the areas of 17 Medical Officers of Health, there being 90 centres of activities assisted by 63 Sanitary Inspectors, 203 schools taking part in these activities. 81 Exhibitions were held and there was an attendance of about 85,930. There were 807 demonstrations with an attendance of nearly 93,113. 57 lantern lectures and 138 lectures without lanterns were given at which the total attendance was about 80,573. The attendance included the general public as well as school population.

The Departmental Radio Talks were given as usual. There were 27 talks in all in English, Sinhalese and Tamil. The talks were on the following subjects:—

- (1) Mental Hygiene.
- (2) Venereal Diseases.
- (3) School Health Work.
- (4) Health and Holiday.

There were 3 issues of the "Health News" during the year devoted to—

- (a) Mental Hygiene.
- (b) School Health Work.
- (c) Venereal Diseases.

During the floods in August, 1947, a great deal of publicity work was done through the radio and the press to safeguard the health of the residents of flood-stricken areas. A special leaflet was issued giving instructions how to avoid diseases that might break out as a result of the floods.

Section 8—MEDICAL RESEARCH INSTITUTE.

The Medical Research Institute was established on March 1, 1946, by the re-organisation and expansion of the then existing Bacteriological Institute, consequent on the acceptance by the State Council on December 4, 1945 of the following resolution moved by the Hon. Mr. George E. de Silva, Minister for Health:—

"The Executive Committee of Health recommends that a Medical Research Institute be established within the Department of Medical and Sanitary Services by the re-organisation and expansion of the present Bacteriological Institute.

“ Hitherto no special provision has been made for Medical Research. Medical Research has been left to individual initiative and enterprise, and a certain amount of medical research work has been and is being done at the Bacteriological Institute, in the Medical Entomologist's Laboratory, in the Faculty of Medicine, and by individual officers. The Bacteriological Institute has been mainly concerned with routine laboratory work, and for want of special facilities and inducements it has not been possible to give an impetus to research and to sustain the interest of individuals in such work. If high standards are to be set and maintained in medical practice and medical education, research must be systematically organized and actively encouraged.

2. “ The proposal to establish a Medical Research Institute was first mooted in 1913 by Dr. Aldo Castellani. The Bacteriological Institute had then been in existence for 13 years, but its inadequacy for the larger and ampler purpose of general research in medicine was realized. That proposal did not materialize, and two more attempts to revive it in 1919 and 1931 failed. The present Bacteriological Institute was built in 1936 as part of the larger scheme for the establishment of a Research Institute, but there was no precise indication of the lines of future development. The Institute contained the Bacteriological and Pasteur Institutes and the Vaccine establishment. In 1938 a Nutrition section was organized; in 1940 the section for Pharmaceutical preparations; in 1942 a section of Parasitology; in 1944 a Blood Plasma section; and in 1945 a Biochemistry section. In this Institute the Medical Department possesses the essential elements for the inauguration of the new scheme. The work undertaken by the Institute at present includes the preparation of the Medical Department's full requirements of Calf Lymph and the T.A.B., cholera and other vaccines. In the Pharmaceutical section a start has been made with the preparation of Glucose saline, grape sugar, Hartman's solution, quinine hydrochloride solution, Champhor and Ether, and an appreciable saving of expenditure has thereby been affected. This is an important branch of work which has to be further developed in the proposed Medical Research Institute.

3. “ (i.) It is proposed that the Medical Research Institute should contain the following Departments :—

- Bacteriology Department.
- Mycology Department.
- Virus Diseases Department.
- Parasitology Department.
- Entomology Department.
- Nutrition Department.
- Biochemistry Department.
- Pharmacology Department.
- Experimental Pathology Department.
- Serum Department.

There will also be 4 Sub-Departments for the following ancillary purposes :—

- Statistics.
- Scientific Modelling.
- Photography.
- Workshop.

Department of Bacteriology.

This will include clinical and public health bacteriology, and the preparation of standard and autogenous vaccines.

Department of Mycology.

Research in medical mycology was conducted in the time of Dr. Castellani's association with the Bacteriological Institute, but little progress has since been made. This Department will be a small but important one.

Department of Virus Diseases.

This will include the Pasteur Institute and the Calf Lymph establishment and will undertake the preparation of anti-rabic and small-pox vaccines, besides research in the commonest virus diseases.

Department of Parasitology.

This will include protozoology and helminthology. The laboratory work for the ankylostomiasis campaign will be performed in this Department. The laboratory and research work involved in malaria control will not be undertaken unless it is decided as a matter of policy that the Department of Malariology should be included within the Medical Research Institute.

Department of Entomology.

It is proposed that the Medical Entomologist's Department should, on the retirement of the present Medical Entomologist, be incorporated within the Medical Research Institute as its Department of Entomology. This Department will perform an important and useful function in the investigation of tropical diseases.

Department of Nutrition.

This Department is already in existence and undertakes the investigation of the diets and nutrition of the population, and research on food values and nutritional disorders. This should be expanded to serve also as a food laboratory.

Department of Biochemistry.

Nutritional chemistry, especially the analysis of foodstuffs and vitamins estimation by clinical methods will be included within the scope of this department's work. Bacterial chemistry will also be undertaken.

Department of Pharmacology.

The present pharmaceutical section is to be expanded into a Department of Pharmacology. The main function of this section would be the standardisation of drugs. It is also intended that it should undertake the investigation of indigenous drugs.

Department of Experimental Pathology.

This is an essential department in the Medical Research Institute. Experimental pathology has received little attention in the past. It is a branch of medical science which is of great consequence both in the investigation and treatment of diseases.

Serum Department.

At the early stages this department will concentrate on serum standardization work. Its expansion to enable the preparation of sera to be undertaken is a matter that should receive further consideration. The Serum Department will also undertake Blood Plasma filtration work, which now forms a separate section.

As regards the sub-departments—

The Statistical section is needed for the planning of experiments and assessment of results;

Scientific modelling is essential for purpose of teaching and public health propaganda;

The Photographic section and workshop are also necessary appurtenance.

(ii.) Investigation Wards:

The Institute must be provided with 2 Investigation Wards to enable research officers to study the results of their laboratory tests in relation to the diagnosis and treatment of cases.

(iii.) Staff:

The permanent staff of the Institute will consist of the Director, Specialist Officers in charge of Departments, Medical Assistants, Research Assistants (who

would be non-medical men), Laboratory Assistants and minor staff. All departments will be in charge of medical specialists with the exception of the Biochemistry, Entomology and Serum Departments, to which non-medical specialists may be appointed.

For appointment as a specialist officer special qualifications of a recognized standard will be required in addition to practical experience in the particular subject.

The Medical Assistants will be recruited from Medical Officers of the department who show a special aptitude for, and interest in, research. Medical Assistants who obtain special qualifications will be placed in a grade of Research Officers. It is from this grade that the Medical Specialists in charge of Departments will be recruited.

The grade of Research Assistants will be filled partly by the recruitment of graduates in science and partly by the promotion of Laboratory Assistants who show exceptional promise.

The personnel of the Institute when it attains to final development should be as follows:—

| | Specialist Officers. | Medical Assistants. | Research Assistants. | Laboratory Assistants. |
|---------------------------|-------------------------|------------------------|-------------------------|---------------------------|
| Bacteriology .. | 1 | 3 | 2 | 8 |
| Mycology .. | 1 | 1 | — | 1 |
| Virus Diseases .. | 1 | 1 | — | 5 |
| Parasitology .. | 1 | 1 | 1 | 2 |
| Entomology .. | 1 | 1 | 1 | 2 |
| Nutrition .. | 1 | 1 | — | 2 |
| Biochemistry .. | 1 | — | 2 | 2 |
| Pharmacology .. | 1 | 1 | 3 | 3 |
| Experimental Pathology .. | 1 | 1 | — | 1 |
| Serum Department .. | 1 | — | 3 | 3 |
| | 10 | 10 | 12 | 29 |

Statistical Section: Statistician and Assistant Statistician.

Scientific Modelling Section: Modeller and Assistant.

Photographic Section: Technician and Assistant Technician.

Workshop: Foreman, Electrical Technician, Carpenter, and Glass Blower.

(iv.)—Salaries of Staff:

The scales of salaries to be assigned to the various grades of officers in the Medical Research Institute will receive the attention of the Salaries Committee.

4. It is proposed that the scheme should be put into effect over a period of 10 years, during which period the necessary personnel could be trained. If the proposed scheme of training is followed, the sub-departments could be opened according to the following programme:—

- 1945-46 Bacteriology and Parasitology. (Specialist Officers for these two departments are already available).
- 1946-47 Biochemistry. (No difficulty is likely to be experienced in securing a Specialist Officer for this Department).
- 1948-49 Entomology.
- 1950-51 Nutrition.
- 1951-52 Virus Diseases.
- 1952-53 Pharmacology.
- 1953-54 Experimental Pathology and Serum Work.
- 1954-55 Mycology.

The conversion of the Bacteriological Institute into a Research Institute could commence therefore immediately after the adoption of this resolution with the creation of the posts of the Director of the Medical Research Institute and the two Specialist Officers for the Departments of Bacteriology and Parasitology. Provision has been voted in the 1945-46 Estimates for the staff of the Institute to be strengthened by the addition of 2 Medical Officers, 3 Chemists and 6 Laboratory Assistants.

5. The Medical Research Institute is to be developed on the present site. The land on which extensions would have to be provided has been used for the construction of certain buildings by the Department of Civil Defence. Some of these buildings could be utilized for the purpose of the Medical Research Institute.

A new three-storeyed block would also be required. The ground floor of this new building would accommodate the Serum Department, the Department of Experimental Pathology, the General Office and Stores, and rooms for the Director and his staff.

It is proposed that the first floor of the building should be occupied by the Departments of Entomology and Parasitology and by the Scientific Modelling Section.

The second floor would accommodate the Departments of Pharmacology, Nutrition and Biochemistry and would include the laboratories for pharmaceutical preparations, drug standardization, biochemistry, food and nutrition, and the statistical section. This new building should be completed by the end of 1947.

For this purpose the land at present available would be sufficient, but more land would be needed for the construction of quarters for resident staff and for purposes of future expansion. It is proposed that negotiations should be entered into with the Colombo Municipal Council to obtain the land on which the Municipal dog pound is now situated. Apart from this, a small extent of land belonging to private individuals and which is situated in the vicinity may also be required.

The building now in use could accommodate the Departments of Bacteriology, Mycology and Virus Diseases, and also the Vaccine, Serology, Anti-rabic and Calf Lymph Sections.

The two Investigation Wards should be provided by the end of 1946.

6. The Medical Research Institute could continue to provide the University authorities the services which the Bacteriological Institute now renders for purposes of medical education. The assistance which the University needs for this purpose may be provided by arrangement between the Ministry of Health and the Ceylon University.

7. It is intended that a Research Advisory Board on which eminent representatives of the medical ancillary sciences will find a place should be established.

8. The Executive Committee of Health's proposal is that the Ceylon Government should assume the responsibility for organizing and promoting medical research. If the recommendations contained in this report are accepted the amplest opportunities and facilities and, also, it is hoped, the most generous terms, which the resources of the Government can afford, will be assured to persons willing and competent to undertake this important work."

General Review.

The reorganisation of the Medical Research Institute was continued during the year 1947. The internal administrative machinery was improved and special attention was paid to each department with a view to modernising technique improving efficiency and promoting research.

The reorganising of the internal administration has facilitated work.

Specimens sent for examination are handled soon after they are received and the reports are despatched, where necessary by telegram, on the same day as the tests are completed. There is a high level of accuracy in the reporting of results.

As regards the manufacture of vaccines, a quantity sufficient for six months is kept in stock, so that the Institute may be able to cope with an increased demand which may result from epidemics. Tests for the potency and purity of vaccines are strictly enforced and no batch is released for issue which does not satisfy these high standards.

The preparation of pharmaceuticals has reached a point beyond which it is not possible to proceed without further training of staff and the establishment of a separate institution for this purpose. The quality of the products has been maintained at a high level.

The work for the year has been marked by a steady increase in the volume of routine and it is feared that unless other laboratories are rapidly developed to carry out ordinary routine procedures this Institute may find it increasingly difficult to devote attention to investigation and research, the primary functions for which the Medical Research Institute has been established.

Certain investigations have been carried out during the course of the year. Some have been completed while others are being continued. Their scope has necessarily been limited, but the findings have been in many cases of much value in the furtherance of curative and preventive measures for the health of the population of Ceylon.

The development of the Institute has proceeded, more or less on the lines laid down in the resolution moved by the Hon. the Minister for Health and accepted by the State Council on December 4, 1945.

A new Department of Clinical Pathology has been added in order to pay special attention to new development in this subject, such as for example the Rh factor, the investigation of which in Ceylon is necessary and is likely to yield information of considerable value for the health of the population. It is not intended to undertake ordinary routine tests in this laboratory.

Provision has also been included for the establishment of a small section on Malariology under the Departments of Parasitology and Entomology for the purpose of research. It is intended that the main line of investigation will be in the laboratory with associated field experiments where necessary. This section will not undertake routine laboratory procedures for malaria control.

The attention of the public has been focussed on indigenous drugs and there have been many requests for their investigation in this Institute. Provision has now been made for the establishment of a separate section for this purpose under the Department of Pharmacology. While some work of value can be undertaken immediately, it will not be possible to staff this section satisfactorily until chemists and pharmacologists are suitably trained.

The building up of a good library is essential if research of a high order is to be undertaken. The Institute is fortunate in having already the complete series of a number of periodicals on Bacteriology and allied subjects. The standard publications in all the branches of medical laboratory work and research are now being obtained so that no worker may be handicapped by the lack of knowledge of the most recent work in his own branch of research.

In accordance with the scheme of training of the staff of this Institute a Laboratory Assistant undertook a study tour in India for a period of six months. Two Medical Officers proceeded to the United Kingdom early in 1947, one for the study of Bacteriology and Virus Diseases, the other for Nutrition. Towards the end of the year two Research Officers were sent abroad on a three year course of training, one to study Nutritional Chemistry, the other Bacterial and Enzyme Chemistry.

The Institute has not been able to keep to its programme of development in certain respects. The building programme has been delayed as a result of the failure to find a suitable site for extensions. The insufficiency of laboratory accommodation is at present seriously affecting the growth of the Institute, and every effort is being made to obtain a suitable site and to build the three storeyed block for expansion.

The sudden conversion of a laboratory of the Department of Medical and Sanitary Services into a separate unit for research has necessarily created new administrative problems. A new relationship between this self-contained unit for research and the health and curative services is in the course of evolution, which it is hoped, will remove the present difficulties and promote the growth of organised research and its application to the needs of the population.

DEPARTMENT OF BACTERIOLOGY.

The routine work of the Department of Bacteriology is very heavy and is in fact increasing from month to month. To meet these increased demands some additional staff has been appointed, but the stage has now been reached when more work cannot be undertaken without a lowering of efficiency. In clinical

bacteriology the best results can only be obtained by attention to detail and to the special needs of each individual case; such attention is at present almost impossible.

Biological Types of *C. Diphtheriae*.

Pure cultures of the organism were obtained from 164 positive throat swabs sent to the Institute for examination for *C. diphtheriae*. Neil's medium was used for the colony appearance and confirmed by the starch and glycogen fermentation reactions, virulence on guinea pigs and haemolysis of ox and rabbit blood.

Of the 164 cultures 140 were found to be *C. diphtheriae* mitis, 17 *C. diphtheriae* intermedius and 7 *C. diphtheriae* gravis.

Bacteriological Examination of Water.

The value of Eijkman's test in detecting faecal pollution in water was assessed.

564 samples of water from wells, reservoirs, &c., were tested by this method in the water-bath at 44° C and the routine method of incubation at 37° C. The two tests were run parallel.

The total number of samples found positive for faecal pollution by both methods put together was 198. Of these 159 gave positive results by Eijkman's tests, whilst the routine method gave only 100 positive results.

Of the 159 samples which gave positive results by Eijkman's test, 98 samples were positive by Eijkman's test alone and would have been missed if the routine test alone was used. Of the 100 samples which gave positive results by the routine test, 39 samples were positive by the routine test alone and would have been missed if Eijkman's test alone was used in the examination. As the number of samples showing faecal pollution that would have been missed, if one test alone was used would be appreciably large, both tests are being used for each sample.

The presence of faecal *B. coli* in water is taken as evidence of faecal pollution of a sample of water. Other lactose fermenting organisms such as *B. aerogenes*, *B. intermedius* and other irregular types, if present in a sample of water are assumed to be derived from dust, soil and vegetation. An attempt is being made to find the frequency of these organisms in faeces. So far 27 samples of faeces have been examined from which 180 colonies have been selected and tested. Stools were inoculated into Mc Conkey broth and incubated at 44°C in water bath. All the 180 colonies consisted of *B. coli*, 166 of type 1 and 14 of type 11.

When the incubation was done at a lower temperature, 37°C, besides *B. coli*, few other lactose fermenting organisms such as *B. aerogenes* types 1 and 11, *B. intermedius* and irregular types also grew. A detailed account of the test carried out is not given here but as far as it goes it too emphasises the value of Eijkman's test.

Prevalence of Kala Azar.

The Formol-Gel test for Kala azar has been carried out on 21,772 specimens of blood sent for the W. R. test. 41 of these gave a positive reaction. The majority of the positive samples came from Chilaw, Kurunegala and Nikaweratiya.

Further investigations for the presence of Kala azar were carried out at Delft, Jaffna and Hambantota.

- (a) At Delft the hospital and dispensary returns for a period of seven years were scrutinized for evidence of any epidemic during this period. The early and late months each year showed an incidence of an increase of malaria. A moderate number of ulcer cases was present throughout the year. Among 388 children there was one case of the enlarged spleen. 25 blood films, 6 ulcer smears and two blood for Formol-Gel tests from suspected cases were taken. All were negative for Kala azar.

The prevalence of sand flies in Delft is high during certain months and is seasonal.

- (b) *Jaffna Hospital*.—Four Formol-Gel tests and 4 blood films taken from suspected cases were found negative for Kala azar.
- (c) *Hambantota Hospital*.—Seven Formol-Gel tests and seven blood films taken from suspected cases were found negative for Kala azar.

CLINICAL BACTERIOLOGY (INCLUDING PATHOLOGY).

The following examinations were carried out during the year:—

| | Specimens examined. |
|---|------------------------|
| Faeces for <i>B. dysenteriae</i> | 960 |
| Faeces for <i>B. typhosus</i> | 149 |
| Sputum for <i>T. B.</i> (microscopic) | 2,412 |
| Sputum for <i>T. B.</i> (Culture) | 1,416 |
| Blood for culture | 173 |
| Vaginal and cervical swab cultures | 826 |
| Urine for culture | 987 |
| Cerebrospinal and functure fluids for culture | 553 |
| Rectal swabs | 1,611 |
| Nasal and throat swabs | 4,106 |
| Other specimens | 177 |
| Smears examined for <i>Gonococci</i> | 9,114 |
| No. examined for <i>T. pallidum</i> | 39 |
| No. of cultures for <i>Gonococci</i> | 31 |
| Smears for <i>Spirillum minus</i> | 10 |
| Smears for <i>Spermatozoa</i> | 27 |
| Serum for <i>T. carateum</i> | 2 |
| Smears for <i>B. leprae</i> | 32 |
| Blood for <i>R. B. C.</i> | 107 |
| Blood for <i>W. B. C.</i> | 114 |
| Blood for <i>Hb.</i> per cent. | 44 |
| Urine for chemical examination | 4,401 |
| Sputum for guinea pig inoculation | 15 |
| Blood for picture | 28 |
| Blood for differential counts | 286 |

Serology Section.

The work in this section has increased considerably during the year. A total of 44,235 specimens of blood and C.S. fluid have been examined during the year. This shows an increase of 2,289 specimens over the previous year. Steps are being taken to divide this section into two units.

Since July, 1947, Weil Felix reaction is being done on all samples of blood submitted for the Standard Agglutination test for Typhoid. Weil Felix reaction was done on a total number of 2,966 bloods. Of these 19 gave a positive reaction with OX 19 and 14 gave positive results with OXK. The distribution of positive blood tests indicates that sporadic cases of typhus occur in Colombo, Jaffna, Galle, Matale, Karawanella, Bogawantalawa and Nawalapitiya and of Scrub typhus in Matara, Colombo, Avissawella, Galle, Aranayake and Negombo.

The Formol-Gel test for Kala azar was carried out on 21,772 specimens of blood sent for the W.R. test. The results are reported elsewhere.

| | Specimens examined. |
|--|------------------------|
| Blood for <i>W. R.</i> | 44,010 |
| Blood for Kahn | 44,010 |
| C. S. fluid for <i>W. R.</i> | 225 |
| Blood for Henry's test | 29 |
| Blood for Standard Agglutination | 6,848 |
| Blood for <i>Widal</i> | 1,342 |
| Blood for clot culture | 6,848 |
| Blood for Weil Felix test | 2,966 |
| Blood for <i>Abortus</i> and <i>Melitensis</i> | 1,586 |
| Aldehyde test for Kala azar | 21,772 |

Vaccine Section.

T.A.B. Vaccine.

| | |
|--------------------------------------|-------------|
| Stock on January 1, 1947 | 30,637 cc. |
| Prepared during the year | 214,410 cc. |
| Issued during the year | 222,885 cc. |
| Balance on December 31, 1947 | 22,162 cc. |

Cholera Vaccine.

| | | | | |
|------------------------------|----|----|----|--------------|
| Stock on January 1, 1947 | .. | .. | .. | 7,066 cc. |
| Prepared during the year | .. | .. | .. | 217,400 cc. |
| Issued during the year | .. | .. | .. | 155,283 cc.* |
| Balance on December 31, 1947 | .. | .. | .. | 69,183 |
| Gonococcal vaccine issued | .. | .. | .. | 3,155 cc. |
| Plague vaccine issued | .. | .. | .. | 382 cc. |
| Auto-Vaccine sets issued | .. | .. | .. | 109 |
| Sterility tests | .. | .. | .. | 478 |

* Including 95,000 cc. despatched to Pakistan.

FIELD LABORATORY AT POLONNARUWA.

The field laboratory at Polonnaruwa was opened on February 26, 1947, to assist the Health Department to investigate the frequent occurrence of outbreaks of cholera in that area. Hospital patients, labourers in colonisation camps and the village population have been examined for the presence of cases and carriers. The waters in the wells and streams were also tested. No carriers have so far been detected. Non-agglutinating vibrios have however been isolated from samples of water. The work is being continued.

SECTION OF VIRUS DISEASES AND PASTEUR INSTITUTE.

Pasteur Section.

The work of the Pasteur Institute has been increasing steadily in spite of the centres in outstation hospitals. The records reveal increases in the number of dogs' heads sent for examination, the attendance for anti-rabic injections and the number of in-patients.

Classification of Dogs' Brains Examined.

| Province. | Positive. | Negative. | Unfit. | Total. |
|---------------|-----------|-----------|--------|--------|
| Western | 358A | 250C | 74F | 682 |
| Central | 63 | 76 | 39 | 178 |
| Sabaragamuwa | 8 | 7D | 10G | 25 |
| Uva | — | — | 1 | 1 |
| Northern | 1 | 2 | 4 | 7 |
| North-Western | 10 | 13 | 8 | 31 |
| North-Central | — | — | 1 | 1 |
| Southern | 15B | 18E | 11 | 44 |
| Eastern | 1 | 2 | 8 | 11 |
| Total. | 456 | 368 | 156 | 980 |

- A. includes—3 cats.
- B. includes—1 cat.
- C. includes—1 goat, 11 cats, 1 monkey and 1 bull.
- D. includes—1 jackal.
- E. includes—1 cat, 1 cow and 1 mongoose.
- F. includes—2 cats, 1 monkey and 1 bull.
- G. includes—1 jackal.

| | | | | |
|--|----|----|----|-------|
| Anti-rabic vaccine prepared in litres | .. | .. | .. | 537.0 |
| Anti-rabic vaccine issued in litres | .. | .. | .. | 268.2 |
| Dog vaccine prepared in cc. | .. | .. | .. | 9,270 |
| No. of anti-typhoid, anti-plague and anti-cholera inoculations given (from August, 1947) | .. | .. | .. | 806 |
| No. of yellow fever inoculations given | .. | .. | .. | 258 |

Calf Lymph Section.

The production of calf lymph has increased steadily. Very strict tests for purity and potency are carried out and the lymph is tried out in special centres before it is released for general issue. A quantity of lymph sufficient for six months is always kept in stock.

| | | | |
|---------------------------------------|----|----|-----------|
| Stock of doses on January 1, 1947 | .. | .. | 1,540,762 |
| Doses prepared during the year | .. | .. | 1,482,024 |
| Doses issued during the year | .. | .. | 633,768 |
| Balance of doses on December 31, 1947 | .. | .. | 2,389,018 |

VIRUS DISEASES RESEARCH.

This section started to function in December. At present the section is housed in a corner of the Students' Laboratory. Due to want of suitable accommodation and the shortage of very essential equipment, progress has necessarily been slow. But encouraging results have been obtained.

Vaccinia virus was successfully cultivated in the chorio-allantoic membrane of the developing chick. Calf lymph was passed through a rabbit intradermally to obtain a bacteria-free seed. This seed was inoculated on to the chorio-allantoic membrane of 14 days incubated chick embryos. The eggs were opened on the fourth day after inoculation and the chorio-allantoic membranes were removed from those with live embryos. Pocks and plaques containing virus had developed on the embryos to varying degree of intensity. The mortality of embryos in inoculated eggs has been high. After the second passage one infected membrane was ground and suspended in 0.85 per cent. NaCl and left to sediment for 15 minutes. The supernatant was injected intradermally into a rabbit. An agar slant and a broth tube were inoculated and incubated overnight at 37°C and were found sterile. On the third day the rabbit developed well-formed papules at the site of injection. The Virus is being maintained in passage. It is being further adapted to the eggs and subjected to more tests for purity and antigenicity, prior to being used as the source of seed and vaccine. The work is being continued.

It is intended to start work shortly on Influenza Virus.

Mycology Section.

Since the commencement of this section a year ago, one hundred and eleven cases of fungus infections have been studied. 57 were lesions of the skin, 2 of the throat, 38 of the lungs and 14 from other sources. The work is being continued.

DEPARTMENT OF PARASITOLOGY.

Research.

1. *Amoebiasis*.—Investigation into the amoebic carrier state (*E. histolytica*) of apparently healthy persons was carried out during the year. The stools of persons who were admitted into the Pasteur Institute for anti-rabic inoculation were examined on several occasions both by direct smears and by cultivation methods. The culture medium used was inspissated sheep serum with an overlay of fresh egg albumin in Ringer's solution. 2,069 specimens of stools received from 319 persons were examined and 73 persons were found to harbour *Entamoeba histolytica* either as trophozoites or cysts or both. This gives a carrier rate of 23 per cent.

2. *Filariasis*.—During the last quarter of the year a filariasis survey of the suburbs of Colombo was undertaken by the Sanitary Division of the Department. The blood smears were examined by this Division. The number examined in the three months was 794 of which 44 were positive for microfilaria. All belonged to the species *Microfilaria bancrofti*. The percentage obtained was 5.5 per cent. This survey is being continued.

3. *Mites in sputum*.—By arrangement with the Physician-in-charge of the Asthma Clinic of the General Hospital, Colombo, certain asthma patients were referred to this Institute for the examination of their sputa for mites and for blood counts. The work commenced during the last quarter of the year. 16 patients were investigated. In 8 cases the eosinophilic count was over 3,500 cells per c.mm. of blood and all were negative for mites in sputum. 11 cases were under 3,500 eosinophilic per c.mm. of blood, of which one showed *Tyroglyphus* mites in scanty numbers. The eosinophils numbered 1,300 per c.mm. of blood in this case. There appears to be a doubt whether there has not been a laboratory contamination in this case. In three cases sporangia were seen.

Routine Examinations.—Numerous examinations of clinical materials were done for the Government Hospitals and Medical Practitioners during the year. They are summarised below:—

| | Specimens. Examined. |
|---|-------------------------|
| Blood for malarial parasites | 782 |
| Blood for Microfilaria | 115 |
| Faeces for Amoebae, cysts and ova | 4,762 |
| Faeces and fluids for flagellates | 13 |
| Faeces for hookworm ova count | 243 |
| Cultures for Amoebae | 199 |
| Segments of tape work for identification | 1 |
| Faeces and fluids for culture for Trichomonas | 15 |
| Blood films for L. D. bodies | 5 |
| Blood for culture for L. D. bodies | 3 |
| Snakes for identification | 4 |

Plasma Section.

The work in 1947 has not been productive of good results. In spite of many attempts to produce filtered plasma fit for transfusion the results have been poor. The filtered plasma when kept for three weeks has shown a cloudy deposit which is not a bacterial contamination. The deposit appears to be due to some change in the proteins.

The factors hindering the work have been the lack of suitable filter pads and of bottles which can stand autoclaving at 20 lbs. pressure and also a pressure of 3 lbs. necessary to force the plasma through the filter. Many bottles have been broken during autoclaving. This has held up the work considerably and unavoidably resulted in the discarding of many bottles of blood before filtration.

Inquiries are now being made with a view to obtaining a freeze-drying apparatus from abroad as soon as possible.

Pharmaceuticals Section.

The production of pharmaceuticals has been maintained at a high level. Special attention has been paid to the quality of the products.

The following has been issued during the year:—

| | Quantities issued. |
|--|-----------------------|
| Sterile pyrogen free water (10 cc. ampoules) | 57,500 cc. |
| Normal saline 0·9 per cent. in double distilled water | *167,870 cc. |
| Sodium citrate 3·85 per cent. (500 cc. bottles) | 373,650 cc. |
| Sodium citrate 25 per cent. (500 cc. bottles) | 28,000 cc. |
| Glucose saline (500 cc. bottles) | 1,065,500 cc. |
| Sodium thiosulphate (10 cc. amp.) | 10,845 cc. |
| Sodium sulphate (500 cc. bottles) | 15,000 cc. |
| Hartman's solution (oral) | 150,200 cc. |
| Hartman's solution (I.V.) (300 cc. bottles) | 88,500 cc. |
| Quinine bihydrochloride (5 cc. amp.) | 5,550 cc. |
| Normal saline 0·9 per cent. in single distilled water | 163,000 cc. |
| Camphor and ether (1 cc. ampoules) | 2,572 cc. |
| Normal saline 0·85 per cent. in single distilled water | 324,000 cc. |
| Morphine (1 cc. ampoules) | 378 cc. |
| Grape sugar 25 per cent. (25 cc. ampoules) | 30,525 cc. |
| Grape sugar 50 per cent. (50 cc. ampoules) | 5,500 cc. |
| Normal saline 0·85 per cent. for vaccine preparation | 450,000 cc. |
| Hartman's solution glucose (500 and 300 cc. bottles) | 19,200 cc. |
| Penicillin cream | 3,266 gms. |
| Vitamin B preparation | 1,725 cc. |
| Penicillin potency tests | 5 |

* in 500, 50, 25 and 10 cc. bottles and ampoules.

DEPARTMENT OF BIOCHEMISTRY.

Routine.

The following routine preparations were made to meet the requirements of Government Hospitals:—

| | |
|--------------------------------------|--------------|
| (a) Protein hydrolysate | 295.1 litres |
| (b) Concentrated yeast extract | 94.5 litres |
| (c) Desiccated hog's stomach | 43 ozs. |

The preparation of the above-mentioned items are as follows:—

(a) *Preparation of protein hydrolysate.*

Fat-free minced beef is hydrolysed by papain for 48 hours at 55° — 60°C. The supernatant liquid is filtered hot, brought up to pH 8.4 in order to precipitate out the phosphates. It is then brought to boil, and filtered. To the clear filtrate are added benzoic acid as a preservative and glucose. The hydrolysate is sealed in sterile bottles and under sterile conditions.

(b) *Preparation of concentrated yeast extract.*

Yeast is extracted twice with rectified spirits, and twice with tap water. The extracts are pooled together and mixed with glycerine and benzoic acid.

(c) *Preparation of desiccated hog's stomach.*

Hog's stomach is freed from fat, sliced and washed several times with warm water to remove as much of the odour as possible. It is then dried at 50°—55°C for 48 hours and defatted with petroleum ether. The product is dried, and ground to a fine powder, and bacteriologically tested before issue.

2. A specimen of a fluid from an abscess, sent by the General Hospital was analysed and found to contain the enzyme, salivary amylase.

3. The protein, fat and lactose contents of breast milk were estimated. The findings were normal.

4. An estimation of calcium in blood was carried out.

5. A sample of urine was analysed for the presence of haemoglobin, haemosiderin and melanin.

6. 160 pints of soya bean milk were prepared for issue at the All-Ceylon Health Week. The process adopted is as given below.

Soya bean was soaked overnight, the skins were removed and the beans ground to a fine paste. The paste was put in a cheese cloth and suspended in a bowl of lukewarm water using 3 quarts of water for each pound of the dry beans. The bag was worked thoroughly with both hands for 5-10 minutes. The milk was boiled on a low fire for 30 minutes, stirring frequently to avoid scorching.

7. 10 samples of imported beans sent by the Food Department were analysed for the presence of prussic acid. The powdered material to be investigated was mixed with water and a few drops of chloroform in a test tube. The vessel was closed with a cork from the side of which was suspended a piece of paper soaked in sodium picrate solution, and left overnight. The presence of prussic acid was established if the picrate paper turned pink.

INVESTIGATIONS.

1. **Hydrocyanic Acid Content in Cyanogenetic Glucoside.**

The method adopted here was a modification of that described by J. H. Roe (Journal of Biological Chemistry 1924, 1119, 667). But it was considered necessary to know the limits of error possible in such an estimation. The best method of approach was to hydrolyse the cyanogenetic glucose, amygdalin with emulsin; estimate the hydrocyanic acid content and compare it with the theoretical value. The emulsion was prepared from sweet almonds and pure amygdalin was obtained by recrystallizing the commercial product from hot water and decolourising with animal charcoal.

The amygdalin together with the enzyme and a little capryl alcohol was aerated for 4 hours, the hydrocyanic acid was absorbed in three tubes containing 100-150 cc. of 5% sodium hydroxide. At the end of 4 hours 10 drops of 10% potassium iodide were added and the solution titrated with 0.01 N silver nitrate until a faint turbidity appeared.

It was found possible to obtain results within 1-2% of the theoretical value.

2. **Yeast from Toddy.**

As a result of investigation carried out here, the following method for the preparation of yeast from local toddy has been worked out.

Toddy was collected fresh from the filtering tank at the distillery and passed through a Sharples centrifuge. The yeast was collected, washed twice with ice-cold water till it was free from acid. It was dried at 70°C for 24 hours, crushed and passed through a 3030-mesh sieve. The product was found to be satisfactory regarding both appearance and taste. The yield was found to be 16 gms. dried product per gallon.

3. Vitamin A Estimations.

An ultra-violet spectrophotometer was installed and the preliminary experiments were carried out to acquire its manipulative technique. The ultra-violet absorption spectrum of 0.003 N in 0.05 N potassium hydroxide was taken and compared with the specimen photograph provided by the manufacturers. The work is being continued.

4. Iodine Estimations.

Estimations of iodine and fluorine contents of waters and vegetables from goitrous areas are being carried out. The iodine contents are estimated by Harvey's Method (Medical Research Council Publications, Special Report No. 201). For the fluorine estimation the colorimeter method of de Boer as modified by Barr and Thorogood was adopted.

Nutrition Section.

The following surveys were carried out in 1947:—

Rural dietary surveys:—Upper Balangoda (Estate), Delft in Jaffna, Pelanwatta and Wetara in Moratuwa

Nutritional surveys:—Nawalapitiya, Gampola, Wattegama, Nuwara Eliya, Eheliyagoda, Deniyaya, Dehiowita, Daulagala, Kadugannawa, Badulla, Horana, Akuressa and Mawanella.

INVESTIGATIONS ON NUTRITION AND DIET.

1. Birth Weights in War-time.

Birth weights of infants for a period of 7 years from the Jaffna, Galle and Kandy Civil Hospitals were analysed.

Jaffna.—For the seven years male births numbered 1,883 and female births 1,869.

The mean for each year for the males exceeded 6 lbs. reaching a maximum of 6.18 lbs. in 1942 and 6.17 lbs. in 1945. The lowest was 6.01 lbs. in 1940. There was no great variation throughout the seven years. The peak of the frequency curve was at 6 lbs.

For the females the mean for each year exceeded 5.68 lbs. reaching a maximum of 6.02 lbs. in 1946. There had been a rise in the birth weights over the 1940 figures in 1941, 1942 and 1943. The peak of the frequency curve for the 7 years was at 6 lbs.

Galle.—For the seven years the male births numbered 3,454 and female births 3,282.

The mean for each year for the males exceeded 5.59 lbs. reaching a maximum of 6.04 lbs. in 1945. There has been a steady improvement in the birth weights each year with a slight fall in 1941 which is not significant. The peak of the frequency curve for the seven years was at 6 lbs.

For the females the mean for each year exceeded 5.42 lbs. reaching a maximum of 5.88 lbs. in 1945. There has been a steady improvement throughout with a slight fall in the last year. The peak of the frequency curve was at 6 lbs.

Kandy.—For the seven years the male births numbered 5,319 and the female 4,906.

The mean for the males for each year exceeded 5.61 lbs. reaching a maximum of 5.92 lbs. in 1940 and 1942. The mean for the years 1940, 1941 and 1942 was steady at 5.9 lbs. but showed a fall in 1943, 1944 and 1945. In 1946 it rose again to 5.83. The peak of the frequency curve was at 6 lbs.

For the females the mean for each year exceeded 5.43 lbs. reaching a maximum of 5.81 lbs. in 1942. There was a steady increase from 1940 and 1942 and there was a steady fall for the years 1943, 1944 and 1945. In 1946 the mean was 5.6 lbs.

The admissions to Jaffna, Galle and Kandy Civil Hospitals, which are Provincial Hospitals, include many cases that reside outside the town in which the hospital is situated. The figures taken as a whole indicate that there has been a marked improvement in the birth weights of infants from the year 1940 till the period of food shortage which commenced in 1943.

In the Galle and Jaffna Hospitals the birth weights of infants showed no deterioration during the year of food scarcity, but in Kandy Hospital there was slight deterioration though it was not a significant one.

2. Investigations at Talwatte Village.

The diet and nutrition of the people of Talwatte were investigated. A dietary survey showed that 22.5% of the families obtained sufficient calories, 45% were borderline cases and the rest consumed diets deficient in calorie value. 90% of the families consumed diets deficient in proteins, 52.5% of the diets showed calcium deficiency. The diets were also deficient in vitamins.

A nutritional survey of the boys' school showed that 40% of those examined were found nutritionally defective whilst in the girls' school there was an incidence of 20%. The hæmoglobin state of both the schools was poor.

A helminth survey showed a high incidence of hookworm, round worm and whipworm infections in both schools.

A full report with the recommendations was submitted to the Talwatta Model Village Committee.

3. Nutritional Surveys among Indian Estate Labourers.

Nutritional surveys of 35 estates throughout the Island covering a population of 8,049 males and 7,708 female Indian estate labourers were carried out and their heights and weights were analysed.

The average adult male weight was 102.6 lbs. and the height 62.8 inches. The average adult female was 89 lbs. and measured 58 inches.

The figures of the heights and weights of children were compared with those of corresponding age groups in India. The average heights and weights of school boys in 3 South Indian towns namely, Coonoor, Mettapulayam and Calicut showed slightly higher figures than the figures for the Indian labourers in Ceylon. At the age of 8 the child of an Indian estate labourer in Ceylon had a height of 44.4 inches and a weight of 38.9 lbs. In Coonoor a child of the same age showed a height of 48 inches and a weight of 42 lbs., in Mettapulayam a height of 47 inches and a weight of 41.3 lbs.; and in Calicut a height of 46.7 inches and a weight of 42.9 lbs.

The figures given for estate children in South India are a little better than those for Indian labourers in Ceylon but they are based on the examination of a much smaller number.

4. Rural Dietary Surveys.

Dietary Surveys were carried out at Delft and among the Polonnaruwa colonists.

Summaries are given below:—

DELFT (AVERAGE OF 50 FAMILIES).

TABLE (a). Foodstuffs consumed in ozs. per consumption unit per day.

| | Average. | | |
|-------------------|----------|----|-----|
| Rice home pounded | .. | .. | 1.7 |
| Rice parboiled | .. | .. | 2.3 |
| Rice imported | .. | .. | 3.4 |
| Meneri | .. | .. | 1.2 |
| Wheat flour | .. | .. | 6.9 |
| Bread | .. | .. | 0.7 |

| | | | Average |
|---------------------|----|----|---------|
| Kurakkan | .. | .. | 0.0 |
| Cereals | .. | .. | 16.2 |
| Local yams | .. | .. | 1.8 |
| Roots and tubers | .. | .. | 1.8 |
| Leafy vegetables | .. | .. | 0.2 |
| Pulses | .. | .. | 0.1 |
| Vegetable fruits | .. | .. | 1.3 |
| Gourds and pumpkins | .. | .. | 0.0 |
| Vegetables (total) | .. | .. | 1.5 |
| Ripe fruits | .. | .. | 2.1 |
| Fresh fish | .. | .. | 2.5 |
| Dry fish | .. | .. | 0.1 |
| Prawns | .. | .. | 0.0 |
| Crabs | .. | .. | 0.0 |
| Mutton | .. | .. | 0.1 |
| Beef | .. | .. | 0.0 |
| Chicken | .. | .. | 0.0 |
| Flesh foods | .. | .. | 2.7 |
| Eggs | .. | .. | 0.0 |
| Coconut | .. | .. | 3.1 |
| Sugar | .. | .. | 1.2 |
| Jaggery | .. | .. | 0.0 |
| Milk | .. | .. | 0.1 |
| Coconut oil | .. | .. | 0.0 |

TABLE (b). Constituents of daily diet per consumption unit.

| | | | Average. |
|-----------------|----|----|----------------|
| Total proteins | .. | .. | 64.5 gms. |
| Animal proteins | .. | .. | 16.2 gms. |
| Total fats | .. | .. | 43.3 gms. |
| Animal fats | .. | .. | 1.7 gms. |
| Carbohydrates | .. | .. | 428 gms. |
| Energy | .. | .. | 2,351 calories |
| Calcium | .. | .. | 0.2 gm. |
| Phosphorous | .. | .. | 0.9 gm. |
| Iron | .. | .. | 12.0 mg. |

TABLE (c). Incidence of Phrynoderma, Sore mouth and Bitot's Spots.

| | | | Total. |
|---------------|----|----|--------|
| Phrynoderma | .. | .. | 3 |
| Sore mouth | .. | .. | 2 |
| Bitot's spots | .. | .. | 1 |
| No. affected | .. | .. | 5 |

TABLE (d). General Particulars.

| | | | Average. |
|--|----|----|----------|
| No. in family | .. | .. | 5.8 |
| No. of consumption units | .. | .. | 4.0 |
| No. of children 12 years and under | .. | .. | 2.1 |
| Cash value of daily diet per consumption unit in rupee cents | .. | .. | 41 |

POLONNARUWA COLONISTS.

TABLE (a). Foodstuffs consumed in ozs. per consumption unit per day.

| | | | Average. |
|---------------------|----|----|----------|
| Country rice | .. | .. | 16.2 |
| Imported rice | .. | .. | 0.9 |
| Rice preparations | .. | .. | 0.2 |
| Kurakkan | .. | .. | 0.2 |
| Bread | .. | .. | 0.4 |
| Wheat flour | .. | .. | 0.4 |
| Cereals | .. | .. | 18.3 |
| Potatoes (imported) | .. | .. | 0.3 |
| Local yams | .. | .. | 1.2 |
| Roots and tubers | .. | .. | 1.5 |
| Pulses | .. | .. | 0.3 |
| Leafy vegetables | .. | .. | 0.8 |
| Vegetable fruits | .. | .. | 1.8 |
| Jak and breadfruits | .. | .. | 0.7 |
| Gourds and pumpkins | .. | .. | 1.2 |
| Vegetables (total) | .. | .. | 4.5 |

| | Average. | | |
|----------------|----------|----|-----|
| Ripe fruits | .. | .. | 0.0 |
| Fresh fish | .. | .. | 0.3 |
| Dry fish | .. | .. | 0.3 |
| Meat | .. | .. | 0.2 |
| Flesh foods | .. | .. | 0.8 |
| Eggs | .. | .. | 0.0 |
| Milk | .. | .. | 0.6 |
| Sugar | .. | .. | 1.2 |
| Coconuts | .. | .. | 2.6 |
| Gingelly Seeds | .. | .. | 0.0 |
| Coconut Oil | .. | .. | 0.0 |
| Jaggery | .. | .. | 0.0 |

TABLE (b). Constituents of the daily diet per consumption unit.

| | Average. | | |
|-----------------|----------|----|----------------|
| Total proteins | .. | .. | 56.0 gms. |
| Animal proteins | .. | .. | 8.6 gms. |
| Total fats | .. | .. | 37.5 gms. |
| Animal fats | .. | .. | 1.6 |
| Carbohydrates | .. | .. | 473 gms. |
| Energy | .. | .. | 2,472 calories |
| Calcium | .. | .. | 0.2 gm. |
| Phosphorous | .. | .. | 0.9 gm. |
| Iron | .. | .. | 17.9 mg. |

TABLE (c). Incidence of Phrynoderma, Sore mouth and Bitot's spots.

| | Total. | | |
|---------------|--------|----|----|
| Phrynoderma | .. | .. | 3 |
| Sore mouth | .. | .. | 10 |
| Bitot's Spots | .. | .. | 2 |
| No. affected | .. | .. | 13 |

TABLE (d). General Particulars.

| | Average. | | |
|--|----------|----|-----|
| No. in family | .. | .. | 5.2 |
| No. of consumption units | .. | .. | 4.1 |
| No. of children 12 years and under | .. | .. | 2.2 |
| Cash value of daily diet per consumption unit in rupee cents | .. | .. | .48 |
| No. of families surveyed | .. | .. | 48 |

5. Iodine and Goitre.

Goitre Investigations.—The endemic areas for goitre in Ceylon have been isolated. Samples of water and vegetables from these areas are being examined.

SCIENTIFIC MODELLING SECTION.

This section, which was started with the appointment of Mr. T. D. de Alwis, was very unfortunate in losing his services.

During the year, the following sets of models were prepared:—

- 2 sets of nutrition models for the Health Week.
- 8 show cases containing models of public health importance were prepared for the Health Van.
- 1 model of the chest of a child showing appearance of tuberculin tests for the Anti-Tuberculosis Institute.
- 1 model of a face showing a primary chance of the lip for the Venereal Diseases Clinic.
- 1 set of 18 items of Ceylon vegetables and fruits for Ceylon House in London.

Section 9—MALARIA AND ANTI-MALARIA CAMPAIGNS.

Introduction.

The activities of this division in previous years were confined mainly to a few campaign centres, a few rural areas and to the oiling of rivers and streams in the epidemic zones. The scheme of residual spraying of houses with D.D.T. was started on an organised basis in November, 1945, in the Anuradhapura District

and was extended to a few more areas during the year 1946. During the year under review the scheme was extended to cover practically the entire malarial parts of Ceylon.

Staff.

The staff consists of the Superintendent, 2 Medical Officers, 9 Clerks, 5 Laboratory Assistants, 1 Supervising Sanitary Inspector, 34 Sanitary Inspectors and 1 Transport Foreman. There are 5 Driver-Overseers, 31 A.M.C. Overseers Grade I., and 39 A.M.C. Overseers Grade II. Besides the minor employees in the office and laboratory and a labour force of 615, the organisation is the same as in the previous year.

Summary of Malaria Control Work done during the year.

Number of Units—

| | | | |
|----------------------------------|-------------------------|---|-----|
| At the commencement of the year: | (a) Mobile Truck Units | — | 18 |
| | (b) Mobile Jeep Units | — | Nil |
| | (c) Town Walking Units | — | 10 |
| | (d) Rural Walking Units | — | 4 |
| At the end of the year: | (a) Mobile Truck Units | — | 30 |
| | (b) Mobile Jeep Units | — | 6 |
| | (c) Town Walking Units | — | 1 |
| | (d) Rural Walking Units | — | 36 |

Area Covered—

Northern Province excluding the healthy parts of the peninsula; entire North-Central Province; North-Western Province and Eastern Province; Uva Province excluding the healthy areas of over 3,000 ft.; almost the whole of Matale District and parts of the Kandy District in Central Province; the Northern parts of Colombo and Kegalla Districts; the greater part of Ratnapura and Matara Districts and the whole of Hambantota District.

| | | |
|---------------------------------------|---|------------------------|
| Number of Health areas under spraying | : | 62 |
| Number of houses under spraying | : | 320,000 approximately. |
| Number of rounds of spraying done | : | The minimum |

number of rounds of spraying possible, *i.e.*, 8 was done in the majority of the health areas. In some cases however the number of rounds varied from 2 to 7.

Total Number of houses sprayed during the year: 1,761,293. In addition all the medical institutions in and around Colombo are regularly sprayed.

Total Quantity of 5% D.D.T. solution used during the year: 809,448 gallons (both Kerosene and Xylene emulsion).

Change over from Kerosene D.D.T. solution to Xylene emulsion: Preparation of emulsion commenced in the 2nd week of November and by the end of November all units were supplied with emulsion concentrate. All units commenced spraying of water emulsion from the beginning of December.

Cost :

| | | | Rs. | c. |
|----------------------------|----|----------|-----------|----|
| Wages and war allowance | .. | .. | 444,900 | 40 |
| Subsistence and batta | .. | .. | 17,272 | 96 |
| Transport | .. | .. | 47,848 | 04 |
| Materials and equipment | .. | .. | 1,349,693 | 43 |
| Rent of stores and garage | .. | .. | 328 | 78 |
| Cost of trucks, jeeps, &c. | .. | .. | 146,102 | 50 |
| | | Total .. | 2,006,146 | 11 |

Evaluation of Malaria Control.

Throughout the year the effect of Malaria Control methods adopted was closely investigated and studied in this division. The entomological part of the work was carried out by the Medical Entomologist's division. This division studied malaria morbidity figures, Spleen Rates, Parasite Rates and the vital statistics relating to the various health areas in which Malaria Control work was undertaken. An improvement was noticed in every one of these items of study. In practically

all hyper-endemic areas there has been a marked reduction in the morbidity and in the Spleen rates. The general death rate and the infant death rate of hyper-endemic areas have come down a good deal, so much so that the general death rate of the Island for the year 1947 was 14.3 which is the lowest on record.

Investigations.

1. *Spleen and parasite surveys* were carried out in March and September, 1947. Owing to shortage of glass slides and stains the parasite survey was not carried out in March. But a survey was done in September. The report of the two surveys have been submitted. The parasite survey report is ready. There is a considerable reduction in the spleen rates of those parts which were taken up for D.D.T. spraying. Similarly there is a reduction in the parasite rate in those parts of the Island which were taken up for D.D.T. spraying.

2. *Investigation of Malaria in Jaffna*, which was undertaken in November, 1946, was concluded and a report was submitted. There is evidence to show that there is a short period of malaria transmission usually during the months of November, December, January and February.

3. *Investigations into the insecticidal effects of Geigy Malaria Spray and Gammexane* were carried out at Nawala, Chilaw and Maho in collaboration with the Medical Entomologist who has submitted his report on these experiments.

4. *Laboratory Experiments* were carried out with a view to determine a suitable formula for the preparation of emulsion concentrate of D.D.T. with Xylene and Triton X-100. The Medical Officer, Anti-Malaria Campaigns, has succeeded in this and we are now able to make a 40% emulsion concentrate. We have ceased to use Kerosene oil solution of D.D.T. and are now using a 40% emulsion concentrate which is prepared in bulk in this office and sent out to the Field Officers who have merely to dilute the concentrate with seven parts of water to get the 5% emulsion. The use of the emulsion has resulted in considerable savings on the Malaria Control Budget.

Laboratory Work.

Examination of Blood Films—

(a) Miscellaneous

| | | | | |
|-----------------|----|----|----|----------------|
| Number examined | .. | .. | .. | 9,503 |
| Number positive | .. | .. | .. | 1,206 |
| Parasite rate | .. | .. | .. | 12.7 per cent. |

Percentage prevalence of species:

| | | | | |
|-------------------|----|----|----|----------------|
| Benign tertian | .. | .. | .. | 65.6 per cent. |
| Malignant tertian | .. | .. | .. | 28.3 per cent. |
| Quartan .. | .. | .. | .. | 6.2 per cent. |

(b) Parasite Survey, September, 1946 (Examination of blood films completed in 1947)

| | | | | |
|-----------------|----|----|----|---------------|
| Number examined | .. | .. | .. | 19,368 |
| Number positive | .. | .. | .. | 704 |
| Parasite rate | .. | .. | .. | 3.6 per cent. |

Percentage prevalence of species:

| | | | | |
|-------------------|----|----|----|----------------|
| Benign tertian | .. | .. | .. | 64.3 per cent. |
| Malignant tertian | .. | .. | .. | 29.1 per cent. |
| Quartan .. | .. | .. | .. | 8.4 per cent. |

(c) Parasite Survey—September, 1947—(Examination not complete. Summary of results obtained so far is given below):

| | | | | |
|-----------------|----|----|----|---------------|
| Number examined | .. | .. | .. | 13,662 |
| Number positive | .. | .. | .. | 152 |
| Parasite rate | .. | .. | .. | 1.1 per cent. |

Percentage prevalence of species:

| | | | | |
|-------------------|----|----|----|----------------|
| Benign tertian | .. | .. | .. | 44.7 per cent. |
| Malignant tertian | .. | .. | .. | 28.3 per cent. |
| Quartan | .. | .. | .. | 27.6 per cent. |

Study Tour of the Superintendent.

The Rockefeller Foundation gave a travel grant to the Superintendent, Anti-Malaria Campaigns, to visit different parts of India where malaria work is being carried out. He was out of the Island for a period of six weeks and visited Bombay, Mysore, Delhi, Travancore and Madras. He was invited by the Malaria Advisory Board of India to attend their conference at the Malaria Institute of India in Delhi and to address them on the Malaria Control organisation of Ceylon. This he did.

Section 10—MEDICAL ENTOMOLOGY.

Laboratory.

The hope that the Division would be able to return to the laboratories in Torrington Square during the course of the year did not materialize. The central laboratory and office continued to be housed in the temporary quarters at the Public Health Museum, the unsuitability and disadvantages of which for research purposes were previously reported. It is hoped that this matter will receive adequate attention in the near future, and that arrangements will be made without further delay to place the laboratories at Torrington Square again at the disposal of the Division.

Staff.

Dr. G. F. Bartholomeusz, formerly Medical Assistant in Entomology, Colombo, and Dr. S. H. Jayewickreme, formerly Research Assistant in Entomology, were appointed Research Officers towards the close of the year. Dr. H. M. H. Abdul Cader vacated the post of Medical Assistant in Entomology, Kurunegala, in August and his successor has yet to be appointed. No important changes occurred in the Field and Laboratory subordinate staffs, the strength of the former remaining at 22 and the latter at 9; the minor staff (45 employees) of the Division also remained unchanged.

Teaching.

Lectures and practical classes in Medical Entomology with special reference to malaria in Ceylon were given in Colombo and Kurunegala during the year, to Post Licentiates, Medical Students, Sanitary Inspectors and Learners, Malaria Overseers and Agricultural Students. In all 186 students were given tuition.

Investigation Work.

Field investigations during the year were largely concerned with the spread and control of malaria. They included mosquito observation work at selected stations and sites in the malaria epidemic zones as previously reported, and several investigations on insecticides used by the malaria control authorities. A special inquiry into the prevalence and species of Anopheline mosquitoes in Jaffna town, and into the sand flies (*Phlebotomus*) of Delft Island were also undertaken.

Laboratory work included the examination of all the material collected in the course of the above field investigations, the identification of rat fleas forwarded by the M. O. H., Kandy Municipality, and research on certain species of Trombiculid mites and Culicine mosquitoes.

(a) *Malaria Observation Stations and Subsidiary Sites*: The objects and nature of the work at these stations and sites have been considered in detail in previous reports. This scheme of observation work was initiated in 1935 after the great malaria epidemic and, except for minor modifications, is now mainly of a routine nature. During the year, however, several changes were made in the stations chiefly with a view to extending observation work in relation to the spraying of D.D.T. by the malaria control organisation; and a few of the subsidiary sites were discontinued. The number of stations in operation at the end of the year was 56, and the number of subsidiary sites 316 as against 46 and 339 respectively in 1946. A summary showing the distribution and amount of work done in connection with the malaria observation stations is given on next page.

TABLE I.
Malaria Observation Stations—South-west and Central Ceylon—Summary of Work during the Year, 1947.

| Locality. | No. of Stations. | Adult Mosquitoes. | | | | | Larvae. | | |
|-------------------------------|------------------|-------------------|-------------------------|----------------------|------------|------------------------|------------------------------------|---------------------------|-----------------------------|
| | | Houses Examined. | Night Trapping (Hours). | Mosquitoes Examined. | | Anophelines Dissected. | Infections with Malaria Parasites. | Breeding places Examined. | Anopheline larvae Examined. |
| | | | | Anophelines. | Culicines. | | | | |
| <i>Dry Zone.</i> | | | | | | | | | |
| (a) Low Country .. | 2 | 1,744 | 223 | 1,331 | 394 | 16 | .. | 761 | 3,923 |
| (b) Hill Country (over 1,000) | 4 | 2,529 | 276 | 16,129 | 5,664 | 962 | .. | 2,161 | 30,994 |
| <i>Intermediate Zone.</i> | | | | | | | | | |
| (a) Northern section | 30 | 23,092 | 1,665 | 17,473 | 14,895 | 1,395 | .. | 19,674 | 114,951 |
| (b) Southern section | 5 | 3,777 | 314 | 4,884 | 8,160 | 483 | .. | 2,754 | 19,063 |
| <i>Wet Zone</i> | | | | | | | | | |
| .. | 15 | 10,145 | 928 | 7,323 | 8,173 | 1,275 | .. | 5,584 | 36,491 |
| Totals .. | 56 | 41,287 | 3,406 | 47,140 | 37,286 | 4,131 | — | 30,934 | 205,422 |

Of the Anopheline mosquitoes collected from these stations only 445 (0.94 per cent.) were *A.culicifacies*, and 99 per cent. of these specimens were obtained from the Dry Zone station at Chilaw. This figure for *A.culicifacies* is the lowest recorded since the scheme of work at these stations was introduced, the previous lowest record being 699 (1.1 per cent. of the total Anopheline catch) in 1942 when 73 per cent. were obtained from Chilaw. In 1939 when a severe and widespread epidemic of malaria occurred, *A.culicifacies* formed 8.2 per cent. of the Anopheline catch from 54 stations, and in 1945 when a serious but more restricted epidemic took place it formed 5.2 per cent. of the catch from 46 stations. In this connection it must be noted that the majority of the observation stations were under intensive D.D.T. treatment during 1947; and that most of the *A.culicifacies* catch from Chilaw was obtained during a period of seven months when spraying of the houses was discontinued. The findings in regard to *A.culicifacies* at the observation stations from 1939 to 1947 inclusive are shown in the following table:—

[For Table II.—see page 37.]

The prevalence of *A. culicifacies* larvae from these stations was, however, also low, only 1,376 being collected as against 3,155 in 1946 and 6,659 in 1945; of these larvae 58.6 per cent. were obtained from the two Dry Zone stations, 38.4 per cent. from the 35 Intermediate Zone stations, and 3.0 per cent. from the 15 Wet Zone stations.

At the 316 subsidiary observation sites where regular examinations of rivers and streams for Anopheline larvae are carried out by Sanitary Inspectors and the material sent to the Colombo laboratory for identification and analysis, 7,073 examinations were made and over 40,000 larvae were collected. Larvae of *A.culicifacies*—total 833—were found at 109 examinations as compared with 926 at 148 examinations in 1946 and 4,104 at 567 examinations in 1945. In every case the findings were immediately communicated to the malaria control authorities.

(b) *Malaria Campaign Centres.*—Entomological work at these centres in association with malaria control measures was done during the year at the towns of Anuradhapura, Kurunegala and Puttalam. The work at Anuradhapura is discussed later in this report in connection with insecticides, and that at Kurunegala is given in the report of the M. O. H. for that town. At Puttalam, the mean catching rates per hour for Anophelines in houses were: protected zone 1.8; control zone 1.1; uncontrolled (outside) zone 2.8. Adults of *A.culicifacies* were very scanty and were found only in the uncontrolled zone. Nearly 3,000 Anopheline larvae were collected from various types of breeding places within and outside the town; only 132 of these larvae were *A. culicifacies* the majority of which were obtained from the wells in the protected and control zones.

(c) *Mosquito Investigations: Jaffna.*—Investigations into the prevalence and breeding of Anopheline mosquitoes in Jaffna town were carried out from January to March, 1947, in connection with an inquiry by the Superintendent, Anti-Malaria Campaigns, into an increased prevalence of malaria there.

Anopheline mosquitoes were collected from houses in the early mornings and from cattle-baited traps in the evenings (up to 8.30 p.m.) in wards Nos. 4, 7, 9, 10 and 11. Over 700 houses were searched and 739 Anophelines found, the catching rates per hour ranging from 0.6 (ward No. 11) to 12.8 (wards 9 and 10). *A.subpictus* was the most prevalent species (58 per cent. of the total catch), but *A.pallidus*, *A.varuna* and *A.culicifacies* were also present. The last named species was relatively uncommon, 39 specimens only being captured during the survey; most of these were obtained from houses in wards 4 and 7. In the cattle-baited traps over 1,700 Anopheline were collected, the majority being *A.pallidas* (47.7 per cent.) *A.subpictus* (28.2 per cent.) and *A.hyrceanus* (16.2 per cent.). No infections with malaria parasites were found among the mosquitoes dissected.

In the course of the investigations 2,393 potential breeding places were examined and 45.7 per cent. contained Anopheline larvae. Over 15,000 larvae were

TABLE II.
Malaria Observation Stations—Comparative Findings for *A. Culicifacies*, 1939–1947 inclusive.

| Year. | <i>A. culicifacies</i> (Adults). | <i>A. culicifacies</i> Dissected. | Per Cent. of Stations (examinations) recording <i>A. culicifacies</i> . | <i>A. culicifacies</i> as per cent. of total Anopheline Catch. | Infections with Malaria. | Infection Rate. | Remarks. |
|-------|-------------------------------------|--------------------------------------|---|--|-----------------------------|--------------------|---|
| 1939 | .. 14,057 | .. 9,727 | .. 52.0 | .. 8.2 | .. 155 | .. 1.59 | .. Severe and widespread malaria epidemic—chiefly April to July. |
| 1940 | .. 4,040 | .. 3,244 | .. 35.6 | .. 4.3 | .. 39 | .. 1.20 | .. |
| 1941 | .. 1,360 | .. 1,070 | .. 17.1 | .. 1.6 | .. 13 | .. 1.20 | .. |
| 1942 | .. 699 | .. 526 | .. 11.7 | .. 1.1 | .. 3 | .. 0.57 | .. |
| 1943 | .. 1,461 | .. 970 | .. 12.3 | .. 5.2 | .. 8 | .. 0.82 | .. Increased prevalence of malaria in restricted areas. |
| 1944 | .. 1,088 | .. 718 | .. 9.3 | .. 2.6 | .. 3 | .. 0.42 | .. |
| 1945 | .. 2,590 | .. 1,662 | .. 27.9 | .. 5.2 | .. 26 | .. 1.56 | .. Epidemic in northern part of epidemic zone in latter part of the year. |
| 1946 | .. 1,553 | .. 689 | .. 14.1 | .. 4.0 | .. 1 | .. 0.14 | .. |
| 1947 | .. 445 | .. 16* | .. 6.2 | .. 0.94 | .. — | .. — | * A large proportion of the mosquitoes died soon after capture, probably due to contamination with D. D. T. subsequent to removal to the local office (Chilaw). |

collected and indentified, and were referable to 11 different species of Anopheles: the majority (over 90 per cent.) of the larvæ were those of *A. subpictus* (27.6 per cent.), *A. varuna* (25.4 per cent.), *A. pallidus* (22.5 per cent.) and *A. culicifacies* (18.4 per cent.). The breeding places existent within the town were mainly artificial in character and included wells, gala wells (water storage pits for gardening purposes), borrow-pits, trenches, unbuilt drains, drainage channels, tanks and rice fields; but a limited number of natural pools and swampy areas were also present. *A. culicifacies* larvæ were most prevalent in borrow-pits dug for excavation and sale of sand (yielding 49 per cent. of the total larval catch of this species), pools, built wells and gala wells. The built wells, of which there are a very large number in the town, were serving as important breeding places of *Anopheles* at the time of the survey, the predominant larvæ being those of *A. subpictus* and *A. varuna*; but *A. culicifacies* was present in from 2.9 to 7.3 per cent. of the wells in different wards.

The chief breeding places of *A. culicifacies*, apart from the wells, were essentially of a temporary nature and normally would contain water only for relatively short periods during and after the rains. Nevertheless during such periods some of them, notably the sand-pits, pools and gala wells, would support prolific breeding of this mosquito, and since the majority of these breeding places were "man-made" it is incumbent upon the Local Authorities to take early action to prevent their extension in the future and to effect reduction of those which now exist.

(d) *Sandflies (Phlebotomus)*.—In February, 1947, attention was drawn to the relatively high prevalence of sandflies on Delft Island. *Phlebotomus argentipes*, the carrier of Kala Azar, appeared to be abundant and in view of this fact and of the proximity of Delft to areas in South India where Kala Azar is endemic it was suggested that investigations should be undertaken. Accordingly arrangements were made whereby the research should be carried out by the Director of Medical Research and the Medical Entomologist in collaboration, the former investigating the medical aspects and the latter the entomological aspects of the problem.

The entomological work was undertaken during July to September, 1947, the field work at Delft being done during the dry season from July 22 to August 19. Sandflies were prevalent in houses during the daytime where they were resting mainly on the more sheltered parts of the walls within 2 feet of the ground; and in human-baited traps in, or close to, houses during the evening. Their prevalence varied considerably in individual houses and also in houses of different types. Using the spray-catching method, the average number of sandflies per house varied from 3 to 17, and the mean catching rates per hour from 8.8 to 42.6. The rates were lowest in huts built entirely of cadjan and highest in stone-built and unwhitewashed mud-built houses situated in the East and Central Sections of the Island. In individual houses, however, from 20 to 40 resting sandflies, representing catching rates of from 46 to 93 per hour, were sometimes found. Hand-catching except in one group of houses (mud-built and whitewashed in the Western section) gave lower rates than spray-catching, particularly in those houses where the walls were not whitewashed. In human baited traps, set in or near the 'verandahs of the houses' the catching rates per hour ranged from 2.5 to 26.5 with a mean of 10.5. Trapping in the open using cattle as bait could not be carried out owing to the strong breeze prevailing during the investigation period. The results obtained by using artificial light traps in houses were disappointing, very few sandflies being captured.

Over 1,300 sandflies were collected during the investigations and examination of these showed that four, or possibly five, species of *Phlebotomus* were present. These species were *P. argentipes*, *P. antenatus* (not previously recorded from Ceylon), *P. babu* and one or two which have not yet been identified. *P. argentipes*, the carrier of Kala Azar in India, was overwhelmingly predominant in all areas and formed over 90 per cent. of the total catch. In

collections made from houses *P. argentipes* formed 93.3 per cent. and *P. antennatus* 5.4 per cent. of the catch. Over 60 per cent. of the females of *P. argentipes* from houses were engorged, apparently with blood, and 2.7 per cent. possessed fully developed ovaries. Males constituted 17.4 per cent. of the total *P. argentipes* catch and 63.0 per cent. of the *P. antennatus* catch.

An extensive search for the breeding places of the sandflies was made in various parts of the Island, and 137 samples (each of approximately 12 cu. ins.) were collected from a variety of situations and were subsequently examined by the screen and floatation method for the early stages of these pests. Of these samples 82 were obtained from ruins and 42 from floors, walls and plinths of houses. No larvæ or pupæ of *Phlebotomus* were found, but a pupal case—probably of *P. argentipes*—was recovered from a sample of material collected from the plinth (constructed of soil, sand and cow-dung) of a house in the Western section.

Circumstances permitting, it is proposed to continue these investigations at Delft Island during or immediately following the next rainy season, probably early in January, 1948.

(e) *Entomological work associated with the use of Insecticides.*—During the year experimental work with D.D.T. Gammexane, and some proprietary insecticides were undertaken in collaboration with the Superintendent, Anti-Malaria Campaigns; and observations on the effects of large scale routine spraying with D.D.T. upon Anopheline prevalence in houses were also made in certain malarious areas.

Owing to the great extension of routine house spraying with D.D.T. as an anti-malaria measure in Ceylon during the past two years, it has become increasingly difficult to find sites in malarious districts where conditions are suitable for experimental work. Three experiments were undertaken during the year under review—one at Nugegoda (near Colombo), one at Chilaw, and the third at Maho. Nugegoda is not malarious and house-haunting Anophelines are uncommon; but the village had not previously been sprayed with D.D.T. and showed a high prevalence of Culicine mosquitoes in the houses. Both Chilaw and Maho had been subjected to routine D.D.T. spraying, but this was discontinued several months prior to the commencement of the experiments.

Experiment at Nugegoda.

For the reason given above the experimental work at Nugegoda was done with house-frequenting Culicine mosquitoes, mainly *Culex fatigans*, *C. gelidus* and *C. tritaeniorhynchus*. Three insecticides were used, viz., D.D.T. 2½ per cent. solution in Kerosene (dosage approximately 60 mmg. D.D.T. per sq. ft.). A proprietary D.D.T. emulsion in water (dosage approximately 118 mmg. D.D.T. per sq. ft.) and a proprietary D.D.T. suspension in water (dosage approximately 27 mmg. D.D.T. per sq. ft.). For experimental purposes, the village houses were divided into three groups of 22, each of which was sprayed once with one of the above insecticides; on each side of each group a few houses (4-9) were reserved from spraying and were used for contrast purposes. Observations made before spraying was done showed Culicine mosquitoes present in the mornings in all the selected houses, with catching rates per hour ranging from 60 to 190 in the three insecticidal house groups, and from 40.7 to 116 in the houses reserved for contrast purposes.

Subsequent to the spraying of the houses with the different insecticides observations on mosquito prevalence were made for a period of 40 days. A great and immediate decrease in the catching rates followed spraying in all cases, but simultaneously a considerable decrease occurred in the unsprayed houses. Whether the latter decrease resulted from the spraying of the adjacent houses or was in the nature of a normal fluctuation cannot be stated. During the first 16 days after spraying the catching rates in the contrast houses were much below the original rates obtained, the percentage decrease ranging from 37 to 89. Subsequently the rates in both the sprayed and unsprayed sections

increased, and in one of the latter adjoining the group of houses treated with the proprietary emulsion rose considerably above the original means. Later the rates in all sections again decreased, but did not reach the low levels recorded earlier. In houses sprayed with the D.D.T. and Kerosene solution (pre-spraying catching rate 190 per hour) the catching rates remained below those for the adjoining contrast areas for 37 days; the percentage decrease in mosquito prevalence ranged from 98.4 to 76.3 during the 40 days observation period. In houses sprayed with the proprietary emulsion (pre-spraying catching rate 60 per hour) the catching rates remained well below those for the contrast houses throughout, and the percentage decrease in prevalence ranged from 95.7 to 41.7. In houses sprayed with the proprietary suspension, and used at the dosage advocated by the manufacturers, the pre-spraying catching rate was 72.3 per hour. After spraying the catching rates remained approximately the same as those in the adjoining unsprayed sections during the first 8 days; thereafter and until the 40th day they exceeded those for the unsprayed houses by from 3.2 to as much as 18.3 per hour. The percentage decrease on the pre-spraying catching rate ranged from 91.7 to 20.6.

The percentages of mosquitoes surviving for 24 hours after removal from the sprayed houses were surprisingly high and were, in fact, practically the same as those obtained from mosquitoes caught in the unsprayed houses. The survival rates for mosquitoes from the sprayed houses were: males 62.4 to 84.9 with a mean of 74.6, and females 83.8 to 92.8 with a mean of 89.6. The mean rates for unsprayed houses were; males 74.8 and females 92.5. It is thus evident that a large proportion of the mosquitoes captured in the sprayed houses had not received a lethal dose of D.D.T. Many of these were resting on furniture and hangings which had not been sprayed, and accordingly the high survival rates obtained show that the mosquitoes had not remained sufficiently long on the sprayed surfaces to become poisoned.

Experiment at Chilaw.

In this experiment a suspension of Gammexane in water was used, the dosage of the active principle being approximately 11 mmg. per sq. ft. The houses selected for observation were situated in two groups, the larger consisting originally of 34 houses and the smaller of 15 houses; the nearest houses in the two groups were rather more than $\frac{1}{4}$ mile distant from one another. As previously stated these houses had previously been subjected to routine spraying with a 5 per cent. solution of D.D.T. in Kerosene, but this treatment was discontinued at the end of March, 1947. From the end of May, 1947, they were kept under close observation, the mean monthly catching rates of Anophelines (*A. culicifacies* and *A. subpictus*) in the larger group being 0.4 per hour in June, 2.3 to 2.9 per hour in July to September, and 5.7 in October; and in the smaller group 0.8 in June, 2.4 and 7.7 in July and August, 0.9 in September and 12.5 in October.

Three additional huts were constructed in the larger group after D.D.T. spraying had been discontinued. These three houses gave consistently higher catching rates than any of the others in the group, the means for the five months ranging from 12.3 per hour to 28.5 per hour. Since there were no important differences (in type, construction, or proximity to suitable breeding places) between these houses and the others in the group it would seem that the reduced prevalence of Anophelines in the sprayed houses was due to the residual effect of the D.D.T. and that this effect was still present six months after the last application of the spray. Nevertheless following the rise in the catching rates during October, spraying of the houses in the larger group (now increased to 37) with Gammexane suspension was carried out at the end of the month. The houses (15) in the smaller group were not treated and were reserved for contract purposes, but by an error the officer in charge of routine spraying in the district treated them all with D.D.T. early in January 1948. The experiment had therefore to be prematurely discontinued 10 weeks after the single spraying with Gammexane had been done.

During the first week after spraying no Anophelines were caught in the houses, but during the 2nd to 5th weeks the catching rates per hour progressively increased, being respectively 0.7, 1.4, 2.7 and 3.2. During the first three weeks following spraying, the difference between the catching rates in the sprayed and unsprayed houses was considerable (the latter being 22.6, 11.1 and 16.1), but thereafter it was much less evident, and the catching rates in the two groups of houses were closely approximate in the 4th and 8th-10th weeks.

Experiment at Maho.

In this experiment comparative work with four insecticides is being carried out. These insecticides and the approximate dosages applied were:

- (a) Gammexane suspension in water (10 mmg. active principle per sq. ft.)
- (b) D.D.T. and Kerosene, 5 per cent. solution (111 mmg. per sq. ft.)
- (c) A proprietary 5 per cent. D.D.T. emulsion in water (103 mmg. per sq. ft.).
- (d) A 5 per cent. D.D.T. emulsion in water prepared by the Superintendent, Anti-Malaria Campaigns (119 mmg. per sq. ft.).

The work is being done in five separate villages—one village for each of the insecticides, and the remaining one untreated for contrast purposes. All of these villages were formerly subjected to routine spraying with D.D.T. and Kerosene solution (5 per cent.) as an anti-malaria measure, but this treatment was discontinued in May, 1947. Experimental spraying with the above insecticides was carried out from November 20 to 23, 1947.

Commencing at the end of October a few weeks before spraying was carried out, all the houses in each of the villages were carefully searched once every 10 days for Anopheline mosquitoes. During the first 20 days after spraying, the three villages sprayed with the D.D.T. compounds all gave catching rates far below those recorded in the latter part of November prior to spraying and well below those for the unsprayed villages. Thereafter a rise in the prevalence of Anophelines in the houses occurred, and the catching rates towards the end of December showed an approximation towards those obtained in the untreated villages. In the case of the village which had been sprayed with Gammexane suspension the decrease in the catching rates was definitely less than in the other experimental villages during the first 20 days after spraying and later the rates increased and exceeded those for the untreated villages.

The experiment is still in progress and additional applications of insecticides will be made later in accordance with the findings.

Observations on the Effects of Routine Spraying—Anuradhapura.

The routine spraying of houses (every six weeks) in Anuradhapura and vicinity with a 5 per cent. solution of D.D.T. in Kerosene was commenced in December, 1945. Prior to that date the malaria control measures consisted chiefly of minor drainage and filling works and the routine spraying of potential breeding places with oil; little or no control of the breeding of Anophelines in irrigation channels and rice fields within the town could, however, be undertaken for economic reasons.

The observation work in relation to spraying was carried out during 1947 in three selected areas in the town itself, in two neighbouring villages (Ratmale and Mankadawala) which were also under treatment, and in the third village in the vicinity where no spraying was done. At each site the work included the examination of houses for resting Anophelines, the trapping of Anophelines in the evening using cattle as bait, and the examination of potential breeding places in the vicinity.

Table 111 on page 42 gives the mean monthly catching rates per hour for Anophelines in the houses during the year compared with those obtained during 1946 and during the six years prior to spraying with D.D.T.

TABLE III.

Anopheline Prevalence—Houses, Anuradhapura and Vicinity, 1940–47.

(Mean Catching rates per hour).

| Month. | 1940–1945. | | 1946. | | 1947. | | |
|-------------------|----------------------|--------------------------|--------------------|-------------------------|--------------------|------------------------|-------------------------|
| | Town (Unsprayed). | Villages (Unsprayed). | Town (Sprayed). | Village (Unsprayed). | Town (Sprayed). | Villages (Sprayed). | Village (Unsprayed). |
| January | 3·8 | 13·1 | 0·2 | 10·0 | — | — | — |
| February–April | Nil–0·6 | 7·0–10·8 | Nil–0·02 | Nil–0·02 | 0·1–0·6 | Nil–0·2 | Nil–0·3 |
| May–June | 9·2–10·1 | 7·1–11·1 | Nil–0·02 | Nil | 1·6–4·8 | 1·1 | 0·3–1·8 |
| July–October | Nil–2·7 | 0·2–3·3 | Nil | Nil | Nil–0·07 | 0·12–0·4 | Nil–0·8 |
| November–December | 23·6–27·6 | 21·2–23·6 | 0·1–0·8 | 2·5–2·7 | Nil–0·4 | 0·1–0·3 | 12·6–13·0 |

The mosquitoes caught in the houses during 1946 and 1947 were chiefly *A.subpictus* and *A.vagus*; *A.culicifacies* occurred rarely and in small numbers only. The reductions in the catching rates following the introduction of routine spraying are very considerable and are most evident during the months (November and December) when Anopheline prevalence is normally greatest. In May 1947 the mean catching rates for the town rose somewhat suddenly to 4.8 per hour, but this was due mainly to a considerably increased prevalence of *A.vagus* in one only of the three observation areas within the town. In the course of this work during 1947 over 6,000 houses were examined and 600 Anopheline mosquitoes collected; 18 specimens only of *A.culicifacies* were included.

In the cattle-baited traps nearly 3,500 Anophelines were captured during the year; these were mainly *A.vagus* and *A.pallidus*, the latter being a species which in Ceylon does not commonly frequent houses. No specimens of *A.culicifacies* were captured. The mean catching rates ranged from 22.2 to 33.0 per hour.

Approximately 2,200 potential breeding places of Anophelines were examined in connection with this work in the town and the sprayed and unsprayed villages. Over 10,000 larvae were collected only 60 of which were *A.culicifacies*.

Observations on the Effects of Routine Spraying—Polgahawela and Alawwa.

Work in this district was commenced in January 1947, and was carried out on the same lines as the work at Anuradhapura except that mosquitoes in the houses were collected by the spray-catching method (using pyrethrum) as well as by hand-catching. In this area, however, mosquitoes were extremely scanty in houses in both the treated and untreated villages throughout the whole of the observation period and accordingly no assessment of the effects of the D.D.T. spraying can be made at present.

A summary of the work done is given in tabular form below.

TABLE IV.

Anopheline Prevalence in Houses, Polgahawela, 1947.

| | | Area treated with D. D. T. | | Untreated Area. | |
|----------------------------------|----|-------------------------------|--------------------|-----------------|----------|
| Houses examined (Hand-catching) | .. | .. | 4,608 | .. | 2,818 |
| No. Anophelines caught | .. | .. | 16 | .. | 37 |
| Catching rates per hour | .. | .. | Not exceeding 0·03 | .. | 0·06—0·1 |
| Houses examined (Spray-catching) | .. | .. | 2,797 | .. | 1,733 |
| No. of Anophelines | .. | .. | 77 | .. | 42 |
| Catching rates per hour | .. | .. | Not exceeding 0·1 | .. | 0·04—0·1 |

Culicine mosquitoes were more numerous in the houses than Anophelines but were not abundant. Spray-catching rates for these mosquitoes were similar in both the treated and untreated areas, being from 0.7 to 0.9 per hour. Using cattle-baited traps in the open at night nearly 4,500 Anophelines were caught, the catching-rates in different sites varying from 4.5 to 10.1 per hour; the chief species obtained were *A.vagus* and *A.hyrceanus*. Only 3 specimens of *A.culicifacies* were obtained throughout the year, and breeding places of this species were seldom found.

(f) *Rat-fleas*.—In February 1947, the Medical Officer of Health, Kandy Municipality, carried out a rat-flea survey in the town and forwarded the fleas.

collected to this laboratory for identification. Ninety-one premises (both commercial and residential) were included in the survey and from these 207 rats yielding 763 fleas were obtained. Over 80 per cent. of the fleas were *X.cheopis*, the remainder being *X.astia* and *X.braziliensis*. The gross flea index was 3.7, that for *X.cheopis* 3.0, for *X.astia* 0.4, and for *X.braziliensis* 0.3. The Medical Officer of Health was notified of the high prevalence of the plague flea (*X.cheopis*) and precautionary measures were recommended.

(g) *Acarina: Trombiculidae*.—Work on this group of mites which includes the vectors of Scrub Typhus has been continued and several species—some of which are probably new to science—have been differentiated. The study of these is being pursued. The biological work on *T.acuscutellaris* previously reported has also been continued throughout the year, but unfortunately has suffered certain vicissitudes and interruptions due chiefly to the difficulty of obtaining a constant supply of mosquito eggs for feeding purposes. This species had been reared to the fifth generation in the laboratory, but the culture had to be abandoned leaving considerable lacunae in the studies. It is hoped to complete these studies as soon as conditions again become favourable. Considerable time was given to the improvement of the technique of rearing these mites with particular reference to the conditions of attachment of the larvae to the host. Attachment to the host has been found to occur under several sets of conditions, but it has not yet been possible to determine definitely those which may be regarded as an optimum. Towards the close of the year a natural source of *T.deliensis* adults was found, and subsequent rearing experiments have suggested that the species is not difficult to breed in the laboratory. It is hoped to build up considerable stocks of this vector of Scrub Typhus for experimental purposes in the near future.

Publications.

The following papers have been published or prepared for publication by members of the staff of the Division during the year:—

- (1) Rearing of *Trombicula acuscutellaria* Walch. By S. H. Jayewickreme and W. J. Niles. Nature Vol. 160, p. 578; 1947.
- (2) Notes on some Ceylon Culicine Mosquitoes. By H. F. Carter and D. P. Wijesundara. Ceylon Journal of Science. Section B. Zoology; (in the press).
- (3) The genus *Taeniorhynchus* Lynch Arribalzaga (Diptera, Culicidae) with special reference to the bionomics and relation to disease of the species occurring in Ceylon. By H. F. Carter; (to be published in the Ceylon Journal of Science).
- (4) Some beetles (coleoptera) noxious to man in Ceylon. By H. F. Carter; (in preparation).
- (5) Observations on the bionomics of *Taeniorhynchus* (Mansonioides) *uniformis*. By S. H. Jayewickreme and W. J. Niles; (in preparation).

Section 11—SANITARY ENGINEERING.

In February the Office and Stores of the Division were shifted from the war-time premises at 43rd Lane, Wellawatta, to the former buildings at Torrington Square.

Water Supply.

Work on this important branch of Sanitary Engineering is increasing and may further increase in future with the various Urban Councils and Village Committees all over the Island desiring schemes for pipe-borne water supplies. Inspections were made during 1947 of various towns and institutions with a view to formulating schemes. Reports describing the sources available, the sources possible and recommendations for improvements or augmentation of existing water sources were submitted in the case of the following water supplies:—Hali-ela, Palugama, Viharahena, Residency at Matara, Matugama, Panadura Urban Council, Matale (Nicholoya Augmentation Scheme), Undugoda Hospital, Hanguranketa.

Investigations are in hand for various schemes such as Kosgahapatana, Elkaduwa, &c.

Designs are also under preparation for a scheme of water supply to the Sri Pada Pilgrim routes.

Water Analysis.

A large number of regular, periodical reports on chemical and bacteriological analysis of samples of water from public and medical Institutions and water supplies all over the Island were received as usual and were commented upon. Suitable recommendations for improvements to the supply or source were also made in relevant cases.

143 samples of water from 32 places were examined and 55 samples showed evidence of pollution.

Sewerage Schemes.

Investigations are either in hand or complete for the sewerage schemes for about 18 institutions. Below is a resumé of the position in regard to each:—

- (1) Ibbagamuwa Central School—Under investigation.
- (2) Madampe—under investigation.
- (3) Welisara Hospital—designs in hand.
- (4) Kalutara—Investigations and designs in hand.
- (5) Kankesanturai—Investigations and designs in hand.
- (6) Kurunegala—to be taken up for investigation.
- (7) Udugama Hospital—designs in hand.
- (8) Norton Bridge Housing Scheme—designs in hand.
- (9) Homagama Hospital—designs in hand.
- (10) Pelawatta Mental Hospital—under investigation.
- (11) Batticaloa Hospital—designs in hand.
- (12) Chilaw Hospital—septic tank repairs in hand.
- (13) Ragama Chest Hospital—septic tank repairs in hand.
- (14) Chavakachcheri Hospital—under investigation.
- (15) Karayur Housing Scheme—ready for construction.
- (16) Tataparai Camp—designs in hand.
- (17) Nuwara Eliya Queens Cottage—designs in hand.
- (18) Galle Hospital—Investigations proceeding.

Estate Sanitation.

During the year a large number of plans for the following were received. These were scrutinised and improvements and additions or alterations suggested before approval. A new set of rules governing these is under discussion with the Director of Medical and Sanitary Services.

- (a) Estate Housing Schemes.
- (b) Estate Latrines, &c.
- (c) Estate Hospital.
- (d) Estate Maternity Homes.
- (e) Estate lines and schools.

Constructions of Rural Hospitals and Maternity Homes.

The work on Rural Hospitals and Maternity Homes on which this Division has been fully engaged for some years past continued undiminished during the year under review. In addition, repairs to existing Rural Hospitals and Maternity Homes, construction of mortuaries, wells, kitchens, minor staff quarters, Apothecaries' Quarters, &c., for existing institutions were undertaken.

35 Rural Hospitals were completed during the year. They are—

- | | |
|-------------------|-------------------|
| (1) Silavathurai. | (9) Nikawewa. |
| (2) Godigamuwa. | (10) Hiripitiya. |
| (3) Wetara. | (11) Mundel. |
| (4) Maldeniya. | (12) Bingiriya. |
| (5) Kotaligoda. | (13) Ahangama. |
| (6) Wattegama. | (14) Habaraduwa. |
| (7) Hurikaduwa. | (15) Batapola. |
| (8) Rattota. | (16) Ambalantota. |

- | | |
|---------------------|-----------------------|
| (17) Rarna. | (27) Gomerankadawela. |
| (18) Mawanella. | (28) Hematagama. |
| (19) Cheddikulam. | (29) Akurana. |
| (20) Vidataltivu. | (30) Weliwewa. |
| (21) Tamblegam. | (31) Nachchaduwa. |
| (22) Valaichchenai. | (32) Morawake. |
| (23) Katankudi. | (33) Uduwela. |
| (24) Samanthurai. | (34) Kongahawela. |
| (25) Meegahakiula. | (35) Panwilatenne. |
| (26) Bibile. | |

The following 21 Maternity Homes were completed during the year:—

- | | |
|---|----------------------------|
| (1) Murathalawa. | (11) Chenkaladi. |
| (2) Murathange. | (12) Pannapitiya. |
| (3) Ehetuwewa. | (13) Morawake. |
| (4) Uduwila. | (14) Polpitigama. |
| (5) Talahena. | (15) Bulathkohupitiya. |
| (6) Navatkadu. | (16) Mundel. |
| (7) Meegahakiula. | (17) Karainagar. |
| (8) Extensions to Maternity Home at Tirukovil. | (18) Ranorawewa. |
| (9) Tihariya. | (19) Algama. |
| (10) Katugastota. | (20) Galawela, extensions. |
| | (21) Horawapothana. |

The following 21 Rural Hospitals and 18 Maternity Homes are in the course of construction:—

Rural Hospitals at—

- | | |
|----------------------|---------------------|
| (1) Pallai. | (12) Kuchchaveli. |
| (2) Puthukudyirrupu. | (13) Kosgama. |
| (3) Wellawaya. | (14) Godakawela. |
| (4) Pothupitiya. | (15) Galapatha. |
| (5) Polgahawela. | (16) Gonaduwa. |
| (6) Welimada. | (17) Midigama. |
| (7) Chempianpattu. | (18) Minuwangoda. |
| (8) Imaduwa. | (19) Pamunugama. |
| (9) Habarana. | (20) Pandatharippu. |
| (10) Horawapothana. | (21) Pesalai. |
| (11) Gokarella. | |

Maternity Homes—

- | | |
|----------------------|---------------------|
| (1) Erramadaliyadde. | (10) Marassana. |
| (2) Errawala. | (11) Mirissa. |
| (3) Galagedera. | (12) Owilakande. |
| (4) Galpihilla. | (13) Palataduwa. |
| (5) Hingarakkaduwa. | (14) Ranwela. |
| (6) Mahawalatenne. | (15) Analaitivu. |
| (7) Mahawela. | (16) Thambarambowa. |
| (8) Mannampitiya. | (17) Velanai. |
| (9) Mankulam. | (18) Welipitiya. |

Of the above the following were handed over to the Government Agent, North-Central Province, when in course of construction:—

- (1) Rural Hospitals at Nachchaduwa, Habarana, Horawapothana, and
- (2) Maternity Homes at Ranorawewa, Horawapothana and Mannampitiya.

Workshop and Stores.

Receipts and issues of stores were carried on as usual. The stock of cement stored at the Mental Hospital premises at Angoda was exhausted.

The workshop has now been installed at Torrington Square and in spite of its lack of up-to-date tools and equipment has stood up to the increased work during the year. With the addition of more modern equipment to replace the obsolete and unserviceable ones it will be possible to attend to increased work.

Drawing Office.

The following work was done at the Drawing Office:—

Drainage:

43 sheets of plans drawn in connection with Trincomalee Town Drainage Scheme.

20 Sheets plans prepared and plotted for Badulla Town Drainage Scheme.

30 Sheets plotted for Matale Town Drainage Scheme.

12 Sheets plotted for Gampaha Drainage Scheme.

16 Sheets plotted for Tangalla Drainage Scheme.

16 Sheets plotted for Negombo and Rambukkana Drainage Scheme.

Water Supplies:

20 Sheets of Dickoya, Welisara, Katugastota and Homagama.

20 Sheets of 1 mile plans for Hali-ela, Viharahena and Palugama.

5 plans in connection with *Emergency River Oiling*.

3 large size plans for the Minister of Health showing *Rural Hospitals, Maternity Homes, &c.*

36 tablets for Rural Hospitals and Maternity Homes in English and Sinhalese.

380 copies of site plans for Rural Hospitals and Maternity Homes.

45 New Sites for Rural Hospitals and Maternity Homes.

300 Miscellaneous tracings of various types, including type plans, &c.

100 original plans for Health Centres, Hospital Drainage Schemes, T. B. Booths, &c.

Specifications for the above.

10 enlargements of plans made for drainage schemes.

156 type plans were issued to the general public and Government Departments.

1,105 black ozalid prints were taken and despatched—the majority in connection with construction of Rural Hospitals and Maternity Homes.

Prepared 176 certificates for Apothecaries, Midwives and Nurses for the D. M. & S. S.

Section 12—MOBILIZATION AND SECONDMENTS FOR MILITARY SERVICE.

At the end of 1947 there were only two Medical Officers and one Apothecary of the Department who were mobilized.

Section 13—WORK DONE IN HOSPITALS, DISPENSARIES, &c.

Hospitals.

Thirty-three Rural Hospitals were opened during the year under the new scheme for construction of Rural Hospitals inaugurated during the latter part of 1942. The number of Rural Hospitals functioning at the close of the year was 78. The total number of Hospitals at the end of the year was 223 inclusive of 30 Special Hospitals, 78 Rural Hospitals and 17 Cottage Hospitals. The total number of inpatients was 540,768.

Dispensaries.

Four Central Dispensaries and 41 visiting Stations were opened during the year. At the end of the year there were a total of 221 Central Dispensaries, 174 Branch Dispensaries and 492 Visiting Stations. Twentythree Rural Hospitals were opened during the year at places where there were Central Dispensaries existing already. Two Branch Dispensaries ceased to function as such because Rural Hospitals were opened at those places. The total number of patients treated at the Dispensaries as well as in the out-patients departments of Hospitals was 7,172,724.

Mental Hospital.

The accommodation provided was 2,500 beds. The number of certified patients admitted during the year was 1,216 and the number admitted to the House of Observation was 2,008. The number of certified patients discharged was 375 and uncertified 996. The number of deaths for the year was 467 compared to 720 in the previous year. In addition to the Neuro-Phychiatric Clinic at the General Hospital which was opened in June, 1943, a Child Guidance and Young Peoples Clinic was opened on September 30 of this year in the same premises. The former Clinic is held in the afternoons on Mondays, Wednesdays and Fridays while the latter is held on Tuesdays and Thursdays.

Dental Institute.

32,185 patients including children were treated for the year. The total number of visits paid by patients was 59,892. The number of patients was made up as follows:

| | | | |
|--|-----|-----|--------------------|
| Out-door patients—Adults | ... | ... | 28,315 |
| Children attending the school Clinic | ... | ... | 1,587 |
| In-door patients attending for dental treatment from Hospitals | ... | ... | 2,283 |
| | | | <hr/> 32,185 <hr/> |

A sum of Rs. 884.50 was collected as out-door charges and for dentures supplied to patients. 521 dental operations were carried out under Nitrous Oxide and Oxygen and Chloroform anaesthesia.

De Soysa Maternity Hospital.

The number of patients admitted to the non-paying section was 14,305 and 653 to the paying section. The accommodation provided was 313 beds in the non-paying section, 100 beds in the Regent Street Branch Hospital, and 20 beds in the paying section. The daily average number of patients was 419.27. There were 10,695 live births, 621 still births and 131 miscarriages. The infant deaths totalled 580 and the maternal deaths were 183. The infant and maternal death rate per 1,000 live births were 54.23 and 17.11 respectively.

The total number of operations performed during the year amounted to 668.

Victoria Memorial Eye Hospital.

The accommodation provided consists of 128 beds, 7 beds in the paying wards and 121 beds in the non-paying wards. There has always been overcrowding in the non-paying wards, the daily average indoor patients for the year being 301. The total number of Outdoor cases treated for the year under review was 92,039 and the Indoor cases is 4,015. 2,079 Major operations were done. A school clinic is conducted once a week on every Friday. The total number of cases treated is 128. All these figures show an increase over the last year's figures. The Eye section of the Angoda Branch Hospital is visited weekly by the Surgeon-in-Charge and Visiting Surgeons alternatively once a week. The Leprosy Hospital at Hendala is visited by the Visiting Surgeons once a month.

Laboratory Work.

509,622 Examinations were carried out at the various Hospitals in the Island.

Medical Supplies.

There is still considerable delay in the receipt of Medical Supplies indented for from the Crown Agents. Drugs that are required for urgent use are purchased locally in small quantities.

Dieting.

Sixty-one Hospitals are now provisioned by the Marketing Department. The other Hospitals continue to be dieted by private contractors.

Section 14—TRAINING OF MEDICAL & HEALTH PERSONNEL.

Medical Officers.

During the year under review 19 Medical Officers were granted study leave to obtain specialist qualifications prescribed by the Department to meet its requirements. Of these, two officers were sent for Public Health training to Australia for the first time and the rest proceeded to the United Kingdom. Three other Medical Officers went abroad; one to America under the auspices of the Rockefeller Foundation for further specialized studies in Public Health, another to America and England to study the latest methods, &c., in E. N. T. Surgery, and the third to observe the malaria control measures obtaining in India.

Towards the end of the year the Department was able to send an officer for training in Tuberculosis by following the T. D. D. Course in Madras.

Local Courses of Training.

Six Medical Officers in Grade II. completed a nine months' Post Licentiate Course in March and a further batch of six officers started the Course in July. This batch will be undergoing training on a revised syllabus, which comprises of two parts, viz., a clinical training course and the D. T. M. & H. Course. The period of training was also extended from nine months to one year. In regard to Health work, nineteen officers underwent a course of training for one month at the Health Unit, Kalutara; two officers underwent training in V. D. for two weeks at the General Hospital, Colombo.

Apothecaries.

Twenty-four qualified Apothecaries were given permanent employment. There were 4 resignations, 2 deaths and 10 retirements during the year, 1947. No Apothecary was trained in Public Health work. Thirty bursaries were granted to deserving Apothecary students.

Sanitary Inspectors.

Sixty-nine Sanitary Learners have been undergoing training during 1947. Out of this 64 Sanitary Learners have been given appointment in that year.

Pupil Nurses.

Forty-four English-speaking Pupil Nurses were taken in for training during the year bringing the total under training to 177, of whom 25 completed their training and were posted to different Hospitals. Nine Male Pupil Nurses were also taken in for training during the year. Sixty-nine Swabhasha (Vernacular) Pupil Nurses were also taken in bringing the total under training in this grade to 217.

Public Health Nurses.

Of the three candidates who were selected for training at the Health Unit, Kalutara, 2 had completed their training and been appointed as Public Health Nurses. The other was discontinued from the Training Class owing to unsatisfactory work.

Nursing Sisters.

Two Nurses, who successfully completed the Post-Graduate Course of training for Sisters, were appointed as Nursing Sisters. Seven others are undergoing the same course of training.

Midwives.

During the year 158 candidates were admitted to the training class in midwifery. 126 had completed the course of training after six months' field training at Kalutara, Panadure and Jaffna.

Ward Attendants.

85 males and 62 females among those taken in for training in 1946 completed successfully their course of training in 1947. 100 males and 100 females were taken in for training (one year course) in August, 1947.

Training in Malariology at the Malaria Field Training Centre at Kurunegala.

The Centre was declared open on December 10, 1939. Instructions in Malariology and Field Training in the methods of Malaria Control are afforded at this Centre not only to the Officers of this Department but also to certain class of Officers of other Government Departments as well as the Post Licentiate students of the Faculty of Medicine and the Sanitary Learners.

An intensive course of training lasting six weeks is provided to Medical Officers of Health. This course consists of lectures and demonstrations, tutorials and discussions, field work and exercises, laboratory work, field surveys and sketching, statistics and reports, &c., covering a very wide field on the subject.

A week's course in Malariology to Post-Licentiate Doctors as a University Course organised by the Faculty of Medicine of the University of Ceylon.

A three weeks' course is provided to Sanitary Inspectors employed by this Department. The syllabus and time-table of this course is under revision.

Short, more elementary, courses of training lasting a week are provided to lay officers of certain other Departments, *e.g.*, Sanitary Learners, Divisional Revenue Officers, Rural Development Officers, Land Development Officers, &c.

6 Post-Licentiate Doctors, 27 Sanitary Inspectors, 69 Sanitary Learners and 16 A.M.C. Overseers were trained during the year.

Training at the Kalutara Health Unit.

The Kalutara Totamune Health Unit continued to be the main training centre for all Public Health Personnel in the country. Not only are officers of the Medical Department trained here, but also Officers of other Government Departments as well as non-government officers of various social agencies such as Gramasevekas of the Lanka Mahila Samitiya. This year 2 Health Visitors from India have been undergoing training in Maternity and Child Welfare Work.

Medical Officers.

23 Departmental Medical Officers underwent a course of one month's training in Public Health prior to taking up appointment as Medical Officers of Health. The course of training consisted of lectures and discussions in Public Health Administration, Vital Statistics, Epidemiology, General Sanitation, Maternity Infant and Pre-School Hygiene, School Health Work, Health Education and practical work in the field in most of these subjects.

Divisional Medical Superintendents.

Three Divisional Medical Superintendents had been given a week's training course in general Public Health before their appointment to Supra Grade Posts.

Post Licentiates.

Six Departmental Medical Officers following the Departmental Post Licentiate course at the Ceylon University were given a 3 weeks' course of lectures and practical field training in Public Health Work during the year.

Apothecaries.

Five Departmental Apothecaries completed a three weeks' course of training in Public Health during the year under review.

Refresher Course to Sanitary Inspectors.

A refresher course for Sanitary Inspectors lasting 14 days was conducted during the year and 23 Departmental Sanitary Inspectors attended the course of Lectures and Practical field training work in General Public Health.

Medical Undergraduates.

Continuing the forward policy of the Faculty of Medicine of the Ceylon University to afford Public Health training to Medical Undergraduates, the Fourth year Medical Undergraduates spent the month of May in residence at the Public Health Students' Hostel. This enabled the students to obtain a clear and comprehensive knowledge regarding Public Health problems confronting the Medical Profession in the country.

Gramasevekas of the Lanka Mahila Samitiya.

Ten Women Rural Social Workers of the Lanka Mahila Samitiya were also given a ten days' course of training in Public Health during the year under review.

Section 15.—MEDICO-LEGAL WORK.

The Judicial Medical Officer and the Assistant Judicial Medical Officer, Colombo, examined 6,215 patients and held 492 post-mortem examinations, out of which 4 were exhumations. The Judicial Medical Officer was also summoned by the Attorney-General for the rebuttal of medical evidence for the defence in three Assize Court cases. 95 productions in judicial cases were sent for examination from the Courts of Law in the Island; of these 36 were productions of hair for microscopic examination, 32 were productions for ascertaining the blood groups and 27 were miscellaneous articles such as bones, foetuses, human viscera, &c., for pathological examination. The productions were examined and reported on with the assistance of staff and apparatus of the Forensic Medicine Laboratories of the University of Ceylon.

Medical Officers at other stations held 1,408 post-mortem examinations which included 517 cases of accidents, 205 of suicide and 395 of homicide. A total of 5,694 assault cases were examined out of which 1,939 were cases of grievous hurt. 559 other cases including 97 of rape were also examined.

Section 16—MEDICAL BUILDINGS.

The Department continued to make steady progress. The year under review saw the opening of 13 more Rural Hospitals and 11 more Maternity Homes.

About 23 major additions and improvements to existing institutions were undertaken. These include 18 new quarters, two water supply schemes, one extension to an existing kitchen, one Dental Clinic and a Maternity Ward.

Provision has been made for the acquisition of land in Mulleriyawa, Angoda, for the establishment of a Psychopathic Hospital and a home for mentally defectives.

Some land and buildings belonging to the Agricultural Corps at Wirawila in the Southern Province have been taken over by the Department for the establishment of a T.B. Sanatorium.

A start has been made on the Second Maternity Hospital which is being built at Castle street, Colombo, and work is progressing rapidly. This will assist considerably in relieving the congestion at the De Soysa Maternity Hospital.

Plans and Estimates are ready and provision has been made for an Infirmary at Ragama and the work is to be commenced shortly. Plans and Estimates are also ready for a Children's Hospital in Colombo. Provision has been made and the work will be commenced early.

The air conditioning plant for the new operating theatres at the General Hospital which were completed last year have arrived from America and will be installed early.

All buildings taken over by the Services have been handed back to the Department. Some Service buildings have also been taken over by the Department.

Nine Central Dispensaries were provided for in 1946-47. Eleven more have been provided for this year making a total of twenty.

Section 17—QUARANTINE.

Port Health work was carried out in Colombo, Galle and 15 minor ports. The following is a summary of the work done by the Quarantine Department.

The number of ships granted pratique during the year 1947 was 2,005 as against 1,888 in the preceding year. Of those ships which entered the harbour there were 16 ships with infectious diseases, as against 13 in the preceding year. 2,618,140 bags of rice were fumigated during the year as against 2,521,352 bags in the preceding year.

The number of Bills of Health issued during the year was 1,401 as against 1,489 in the preceding year. 6 Ships were fumigated with Hydrocyanide gas as against 28 in the previous year. Deratization Exemption Certificates were issued to 59 vessels as against 91 in the previous year. 16,351 passengers, 3,546 crew and 2,999 cradles of soiled linen from ships were disinfected at the Disinfecting Station, Colombo.

Mandapam and Thattapparai Camps.

54,577 estate labourers and 158,294 miscellaneous passengers were passed to Ceylon through the Government Quarantine Camps at Mandapam and Thattapparai in South India as against 78,594 estate labourers and 183,681 miscellaneous passengers in the previous year. Of the passengers 113,055 were passed without detention and 45,239 after full quarantine as against the corresponding figures 137,697 and 45,984 in the preceding year. 119,324 passengers and 54,651 estate labourers were vaccinated against small-pox as against 143,341 passengers and 80,317 estate labourers in the preceding year and 49,624 estate labourers were treated for ankylostomiasis as against 72,150 in the preceding year.

Section 18—CEYLON MEDICAL COLLEGE COUNCIL.

The following are the number of persons who qualified as:—

| | | | | | |
|------------------|----|----|----|----|-----|
| (a) Doctors | .. | .. | .. | .. | 43 |
| (b) Apothecaries | .. | .. | .. | .. | 39 |
| (c) Pharmacists | .. | .. | .. | .. | 17 |
| (d) Midwives | .. | .. | .. | .. | 169 |

during the year 1947.

Section 19—FINANCE.

The Revenue and Expenditure for the Financial Year ended September 30, 1947, were Rs. 3,181,159.78 and Rs. 48,304,726.75 respectively. The sum of Rs. 48,304,726.75 includes (a) Rs. 621,606.49 and (b) Rs. 1,642,784.15 spent from Loan Funds on the construction of Maternity Homes and Rural Hospitals respectively, and (c) Rs. 8,839,041.63 spent from the Miscellaneous Vote for payment of war allowance. The cost of new buildings other than Maternity Homes and Rural Hospitals and the cost of improvements to and maintenance of existing buildings have not been included.

The Financial Statement of the administration of the Medical Wants Ordinance (Cap. 176) showed a surplus of Rs. 701,597 on September 30, 1946.

S. F. CHELLAPPAH,
Director of Medical & Sanitary Services.

Colombo, September 7, 1948.

Ref: 6E. 7/48 (E.T.K).

